INDIA
RUBBER WORLD

MAY, 1946

TECHNOLOGY DEPT.

Spheron 6*



TREAD WEAR

HIGH ABRASION RESISTANCE
- TENSILE
- TEAR RESIST[illegible]

MPC
(MEDIUM PROCESSING CHANNEL BLACK)

CABOT
Godfrey L. Cabot, Inc., Boston, Mass.

Du Pont
NEWSLETTER No. 5, MAY 1946
RUBBER CHEMICALS DIVISION
PUBLISHED BY E. I. DU PONT DE NEMOURS & CO. (INC.), WILMINGTON 98, DELAWARE

ELA, A NEW ELASTOMER LUBRICATING AGENT

ELA, a pale yellow liquid, is a new product whose virtue as an elastomer processing aid lies in the fact that it reduces the tendency of stocks to stick to mill rolls without adversely affecting their cohesive strength and self tack. It is believed that its effectiveness is dependent upon a chemical rather than a physical action and thus it represents an entirely new type of rubber chemical. Extensive tests indicate that the material is non-toxic when used under normal conditions.

Methods of Use

Laboratory tests indicate that there are two general methods of using ELA:

1. Added to the stock.
2. Rubbed on the mill or calender roll.

The use of up to 2% of ELA does not affect either the curing rate or the aging characteristics of a basic neoprene stock. For butyl, we do not recommend the use of more than 1% of ELA.

When ELA is added to a stock it is most effective when introduced as close as possible to the point in the processing cycle where sticking occurs. When it is used in highly loaded stocks there is a tendency to lose effectiveness either on long milling or long storage of the uncured stock.

When factory experience indicates that the material be applied to the mill roll rather than the stock, it is suggested that a thin coat be applied to the roll by wiping with a rag moistened with ELA.

Plus Values from ELA

In addition to its primary purpose of preventing sticking to the rolls, laboratory tests indicate that the use of ELA has other advantages. Specifically these tests indicate that the use of ELA will:

1. Improve the surface appearance of the sheeted stock and help to prevent blistering or air checking.
2. Lead to the easy production of calendered sheets of uniform gauge particularly in the case of thin gauges from stocks which have a tendency to be sticky.
3. Widen the temperature range for successful calendering.
4. Speed up the conversion from a frictioning to a sheeting operation where a single calender is used for both purposes. It is suggested that ELA be applied directly to the middle roll for this purpose.
5. Function as a lubricant in extruding operations, facilitating the flow of the stock through the machine.
6. Assist in cleaning tubing machine heads and dies. For this purpose it is suggested that a small quantity of ELA be brushed over the inside surface of the head and die before the run is started.

For more information on ELA write for our Technical Bulletin BL-210.

DU PONT
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

India Rubber World, May, 1946. Vol. 114, No. 2. Published monthly by Bill Brothers Publishing Corp., 386 Fourth Avenue, New York 16, N. Y., U. S. A. Entered as second-class matter December 27, 1944, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.

TECHNOLOGY DEPT.

PUBLIC LIBRARY
JUN 12 1946
DETROIT



THIS HYCAR advertisement, appearing in a long list of business and trade publications, has just one purpose to accomplish — to make it easier for you to sell your customers parts made from HYCAR.

Like the ones which have come before and the ones which will follow, this advertisement tells HYCAR's properties and how they give long life and dependable performance to parts made from HYCAR.

And in closing the copy tells the reader "*Ask your supplier for parts made from HYCAR*"

That's YOU.

And that's about as far as we can go. We offer the finest special-purpose synthetic rubber that can be had, the services of a highly trained research and development staff — plus strong advertising support.

It's up to you to take it from there and make the *profitable quality* sales that will keep you out of the competitive rut.

Reprints of all HYCAR advertisements may be had free for use by your salesmen. Just write Department HC-5, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Hycar

Reg. U.S. Pat. Off.

LARGEST PRIVATELY PRODUCED BUTADIENE TYPE

Synthetic Rubber

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY



IT'S A

DIFFICULT ACT...

but **PHILBLACK A** *won't let you down!*

When it's *high-HOT-tensile* you're after, just try using Philblack A with your GR-S. You'll be surprised to find that it gives much greater tensile strength at 200°F than you get with easy-processing channel black.

Compounding, production and sales departments all know that for economy of manufacture and good customer service—tires must maintain quality at elevated temperatures. And the result of Philblack A's assistance in creating these stellar roles are the encores, repeat orders and increased demand.

PHILLIPS PETROLEUM COMPANY

Philblack Division

EVANS SAVINGS AND LOAN BUILDING · AKRON, OHIO

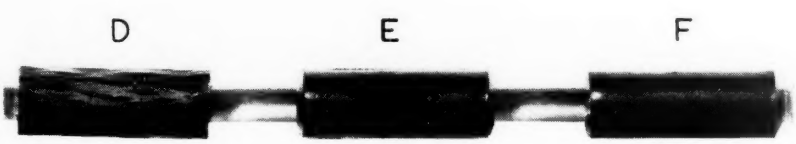
PROTECTION *for* GR-A

BUTADIENE ACRYLONITRILE POLYMERS

NAUGATUCK SUNPROOF

PREVENTS ATMOSPHERIC CRACKING IN GR-A

EXPOSED OUT OF DOORS



NO SUNPROOF	1.0 SUNPROOF	2.0 SUNPROOF
CRACKED IN 2 DAYS	*NO CRACKING IN 85 DAYS*	

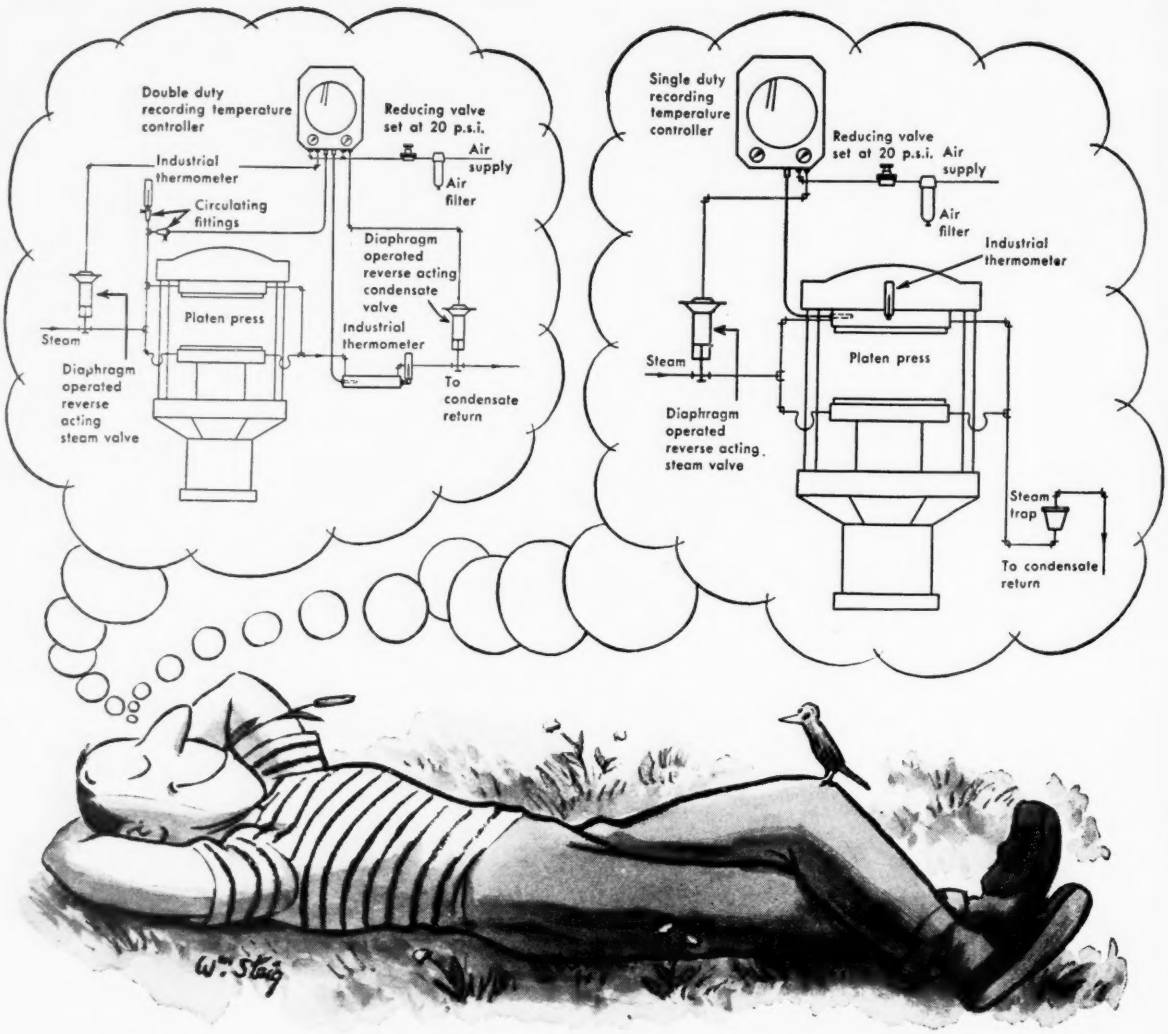
PROCESS • ACCELERATE • PROTECT

with

NAUGATUCK CHEMICAL

Division of United States Rubber Company

1230 AVENUE OF THE AMERICAS • NEW YORK 20, N. Y. BRANCHES: AKRON, BOSTON, DETROIT, NAUGATUCK



Dreaming of higher quality molded rubber?

THESE aren't just idle daydreams. They're two of the wide awake systems Taylor has worked out to give you precise temperature control of platen presses —the *automatic* temperature control you need for higher quality products.

Both systems are governed by a Taylor Fulscope Recording Temperature Controller. All you do is set the desired control point of the instrument. Taylor Accuracy will automatically repeat the same controlled temperature for each process cycle.

When molding specifications are based on platen temperature, we suggest the system on the right. Temperature sensitive bulb is located directly in the steam platen or mold. System on the left combines inlet and outlet temperature control. Both the inlet steam temperature and the condensate temperature from the steam heated platens are controlled by a Taylor Double Duty Recording Temperature Controller.

These are just two of many proven platen press control systems we've designed to help *you* maintain high quality by doing the job *automatically*. Ask your Taylor Field Engineer or write Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

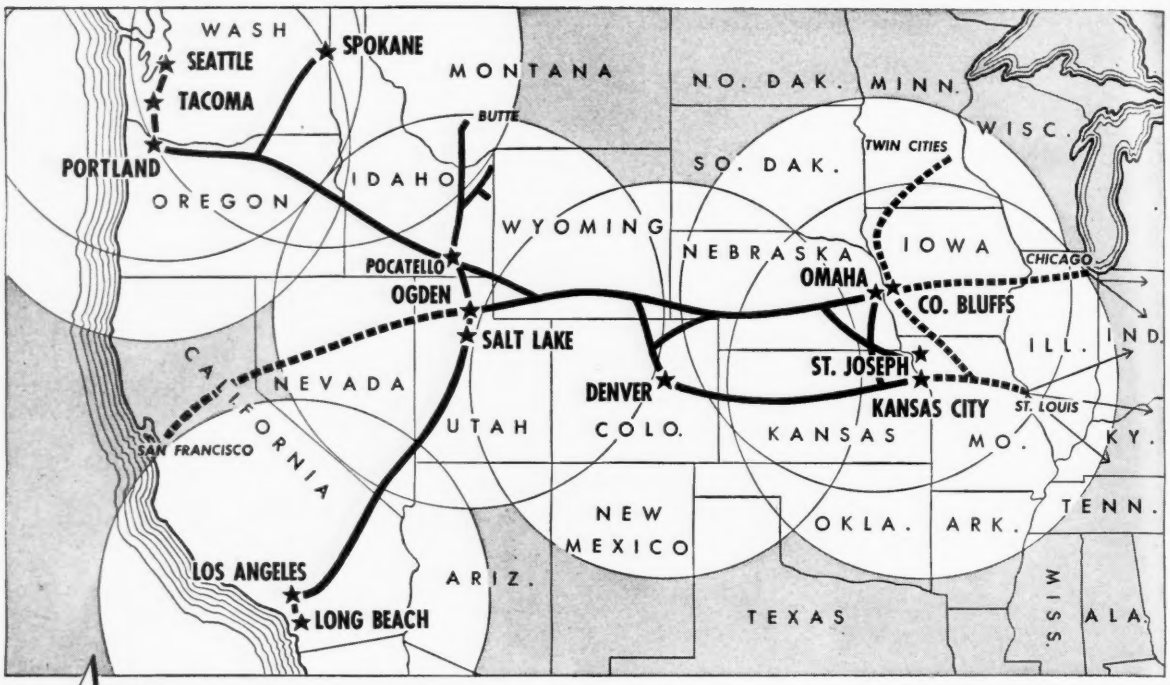


For technical data please write Dept. RA-5

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

ROSE BUILDING, CLEVELAND 15, OHIO



Opportunity for Industry

The western territory served by Union Pacific is rich in countless raw materials required by industry; has power and other necessary facilities; has a high type of native-born labor. Here lies the opportunity for industry to build and expand.

Among the principal industrial tracts owned or served by Union Pacific are those located in, or near by, the following cities:

Omaha, Neb.	Ogden, Utah
Council Bluffs, Iowa	Portland, Oregon
St. Joseph, Mo.	Seattle, Wash.
Kansas City, Mo.-Kans.	Tacoma, Wash.
(Fairfax District)	Spokane, Wash.
Denver, Colo.	Los Angeles, Cal.
Salt Lake City, Utah	Long Beach, Cal.

As the map shows, all these cities are located on the main lines of the Union Pacific Railroad.

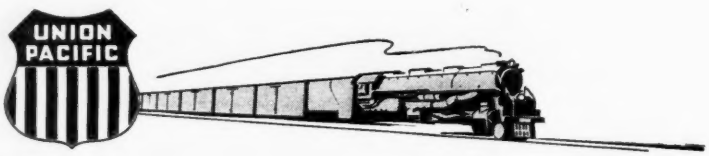
The circles on the map indicate 500-mile distribution areas. In normal times, Union Pacific operates a fast, merchandise freight (L. C. L.) service within these short-haul areas, with door-to-door pick up and delivery service.

These industrial properties are improved and occupied by many diversified manufacturing and commercial enterprises.

Necessary utilities are available and each tract is served by adequate industrial trackage. Whenever required, additional trackage can be provided.

You are cordially invited to write W. H. HULSIZER, General Manager of Properties, Union Pacific Railroad, Omaha 2, Nebraska, regarding industrial districts in territory served by Union Pacific.

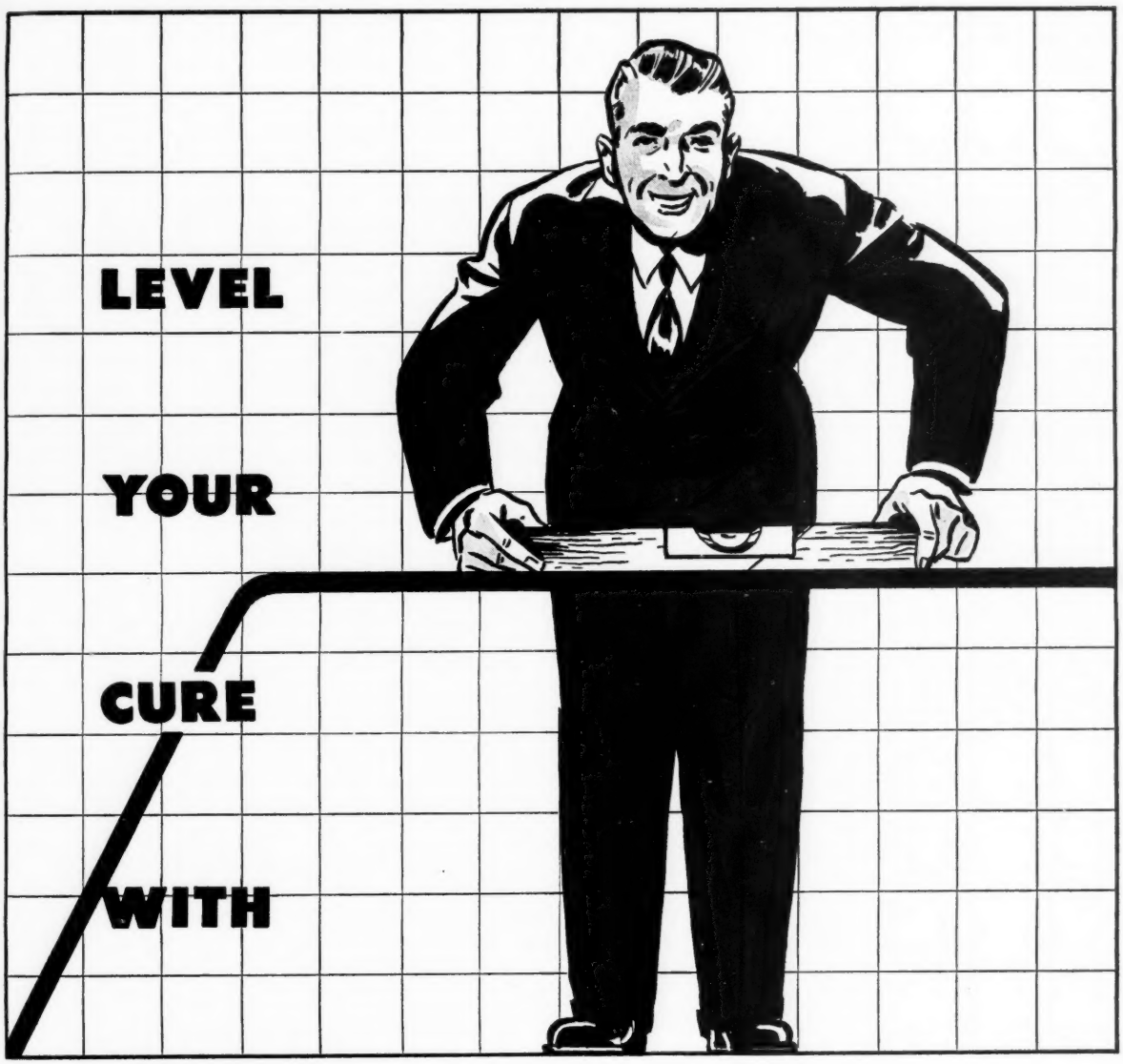
be Specific – say "Union Pacific"



The Progressive

UNION PACIFIC RAILROAD

The Strategic Middle Route



BUNAC . . . Level the cure of your GR-S stocks by the straight addition of 2% to 4% BUNAC K-17. With BUNAC K-17 you obtain activation, better properties in the over-cured state, better aging, and improved cut growth resistance. Your technical bulletin on BUNAC K-17 is ready. Write for it.

WILMINGTON

CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.



Here's the Baldwin Press to do it

Big things are happening . . . fast . . . in the molding field.

There's Hy-speed Plunger molding, for instance. Reported advantages include greater production, better mold design, better uniformity of product, and a reduction in the required press size. In one case, a 10-cavity mold in the new process turned out 60% more pieces than the old 50-cavity mold in the same time.

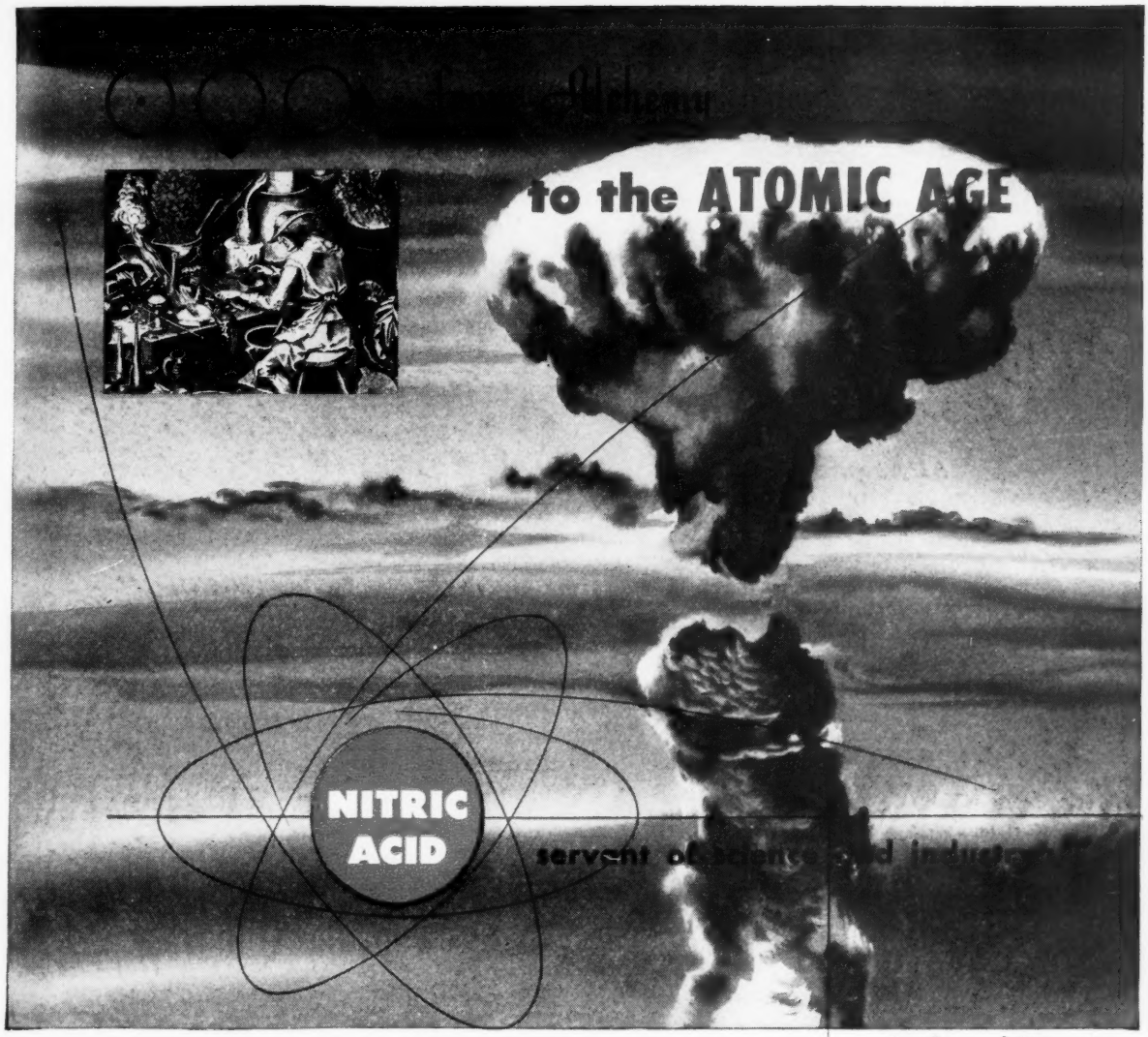
If you're interested in investigating this important new development, Baldwin has the press to do the job. Call in a Baldwin representative. The Baldwin Locomotive Works, Locomotive & Southwark Division, Philadelphia 42, Pa., U. S. A. Offices: Philadelphia, New York, Chicago, Washington, Boston, Cleveland, Detroit, St. Louis, San Francisco, Houston, Pittsburgh, Birmingham, Norfolk.

BLW THE BALDWIN GROUP

BALDWIN

SOUTHWARK

HYDRAULIC PRESSES



NITRIC ACID . . . born in the reeking retorts of ancient alchemy . . . has been an invaluable tool of science and industry down through the ages. Even today, it still finds new, dramatic roles—such as in jet propulsion. Alone and as a component of mixed acid, this versatile product is irreplaceable for a host of applications ranging from explosives to engraving . . . from plastics to dyes. Scores of processes utilize its dual chemical characteristics as a strong acid and as a vigorous oxidizing agent.

GENERAL CHEMICAL HAS PROVIDED this basic chemical to American Industry for almost half a century . . . devoting continuous study to the product's properties and potentialities—and developing a wide range of grades and strengths for varying needs in production and laboratory.

• • •

IF YOU ARE A USER OF Nitric Acid, study the list at right. Here you will find a form of the product suitable for your requirements—always readily available from General Chemical's convenient plants and warehouses. Write or phone your nearest General Chemical Sales and Technical Service Office for full information.

GENERAL CHEMICAL COMPANY

40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston Bridgeport (Conn.) • Buffalo • Charlotte (N. C.) • Chicago • Cleveland Denver • Detroit • Houston • Kansas City • Los Angeles • Minneapolis New York • Philadelphia • Pittsburgh • Providence (R. I.) • San Francisco Seattle • St. Louis • Utica (N. Y.) • Wenatchee • Yakima (Wash.)
In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited
Montreal • Toronto • Vancouver

BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

Grades and Strengths of General Chemical Nitric and Mixed Acids

Standard Grades
36° Be 38° Be 40° Be 42° Be

Diamond Grades
Highest Quality Commercial Acid
36° Be 38° Be 40° Be 42° Be
52.3% HNO_3 Approx. 56.5% HNO_3 Approx. 61.4% HNO_3 Approx. 67.2% HNO_3 Approx.

Nitric Acid 95%
Diamond & Standard (48.5° Be)
Low in Impurities

Other Commercial Grades
including Aqua Fortis, also available

Reagent Grades
B&A Quality
C.P. Reagent A.C.S. Sp. Gr. 1.42
Fuming, Sp. Gr. 1.49-1.50, Reagent
Red, Fuming, Sp. Gr. 1.59-1.60, Reagent

MIXED ACID
Varying proportions of Nitric and Sulfuric Acids up to 100% total acidity to meet customers' requirements.

For Cooler-Running Tires...
Compound GR-S-10 *with* RED LEAD

Here's how you can take full advantage of GR-S-10, the new rubber with improved tack for your tires.

Use #2 RM Red Lead in combination with thiazole and thiuram accelerators. The result is a safer, cooler running tire of improved heat stability. In addition the #2 RM Red Lead assures a practical rate of cure and an extended curing range.

It is effective, efficient and economical.

Two formulas are shown. The accompanying data indicate how the addition of #2 RM Red Lead in Formula "B" helps produce cooler-running, safer tires... tires that last longer, and whose superior balance of original properties is well maintained throughout their service life.

Further information will be supplied upon request to the Rubber Division of our Research Laboratories, 105 York Street, Brooklyn, N. Y.

COMPOUND GR-S-10 WITH RED LEAD FOR THESE 6 GOOD REASONS:

1. Improved Heat Stability —retention of elasticity
2. Lower Heat Build-up — Cooler Running
3. Faster Curing Rate
4. Extended Curing Range
5. Excellent General Physical Properties
6. Safe Processing

FORMULAS

GR-S-10 TREAD STOCK

	"A"	"B"
GR-S-10	100	100
EPC Black	45	45
Zinc Oxide	3.0	3.0
#2 RM Red Lead	—	2.25
Santocure	1.80	—
Thiofide	—	0.65
Thionex	—	0.25
Sulfur	2.00	1.40
Disproportionated Wood Rosin	—	5
Coal Tar Softener	8	3

DATA

Sample	*T/287°F*	*Tensile Strength*	*% Elong.*	*M-300*	*M-500*	*Shore*	*△ T, F°*[1]
A	15	no cure					
	20	270	890	0	80	40	
	30	2490	710	600	1500	51	
	45	3000	635	800	1990	55	66.5
	60	2600	580	875	2200	56	64.0
	90	2500	570	920	2140	56	64.0
B	15	2600	870	240	915	50	
	20	2980	790	415	1290	52	
	30	3170	680	710	1800	56	
	45	3110	630	885	2215	57	63.0
	60	3170	630	880	2190	57	60.5
	90	3000	585	930	2350	57	60.5
		Aged 48 Hr. at 100°C					
A	15	no cure					
	20	insufficient cure					
	30	1600	240	....	....	69	
	45	2060	335	1980	....	68	
	60	2000	340	1700	....	67	
	90	2200	370	1685	....	67	
B	15	2520	395	1730	....	66	
	20	2800	475	1550	....	65	
	30	2725	465	1620	....	65	
	45	2700	450	1660	....	65	
	60	2780	450	1660	....	65	
	90	2620	430	1530	....		

[1]*Goodrich Flexometer at 20°C, Load 100 psi, Stroke, 20%*



NATIONAL LEAD COMPANY

New York 6; Buffalo 3; Chicago 80; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6, (National Lead Co. of Mass.); Philadelphia 7, (John T. Lewis & Bros. Co.); Pittsburgh 30, (National Lead Co. of Pa.).



HERE is a new, light-gravity, non-discoloring reinforcing agent for synthetic rubbers that is a marked improvement over conventional non-carbon-black reinforcing materials.

PLIOLITE S-1 embodies the following outstanding advantages:

1. Insures more uniform, easier-handled compounds because it acts as a plasticizer at processing temperatures.

2. Affords positive reinforcement that combines extra hardness with little or no loss in elongation. Frequently there is a gain in elongation.

3. Thermoplastic, it is very useful processing aid for smooth extrusions and molded products.

4. Excellent abrasion resistance and good flex life make it particularly adaptable to soles and top lifts.

PLIOLITE S-1 will meet your requirements for compounds needing a light color, low-gravity stock of 70-90 durometer hardness with good processing characteristics and moldability. It is effective in GRS, Butyl and Buna-N compounds. Available as a powder for your own mixing, or in master batches in whatever synthetic you select. For complete information and sample, write: Goodyear, Chemical Products Division, Plastics and Coatings Dept., Akron 16, Ohio.

Pliolite, Chemigum—T. M.'s The Goodyear T. & R. Co.

Specify

CHEMIGUM N-3

for all compounds requiring oil-resistant HEAT-STABLE performance.

GOODYEAR

THE GREATEST NAME IN RUBBER



BIN–STORAGE STABILITY
of MIXED STOCKS
PRESENTS INCREASING PROBLEMS
as warm weather approaches

NEOPRENE PEPTIZER P-12
will resolve these problems
in NEOPRENE STOCKS

Write us for technical information. Or, better yet, ask anyone who is using it!

THE CALDWELL COMPANY

2412 First Central Tower
AKRON 8, OHIO

Trade Mark Registered

Patent Applied For



"...HIGH ABRASION RESISTANCE"

WITCO CHANNEL BLACKS

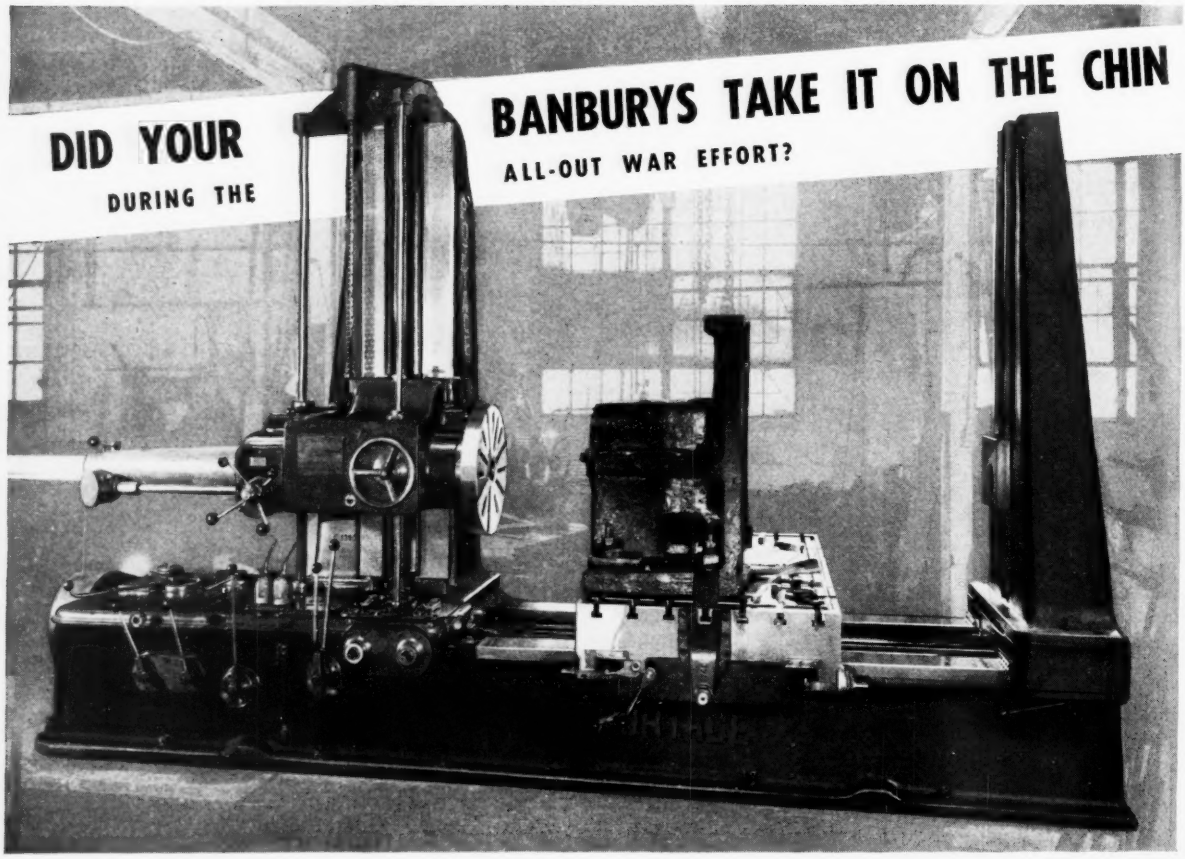
Witco Channel Blacks impart definite and distinctive properties to synthetic and natural rubber formulations. For instance, Witco Black #12 is an easy processing channel black which imparts to synthetic or natural rubber higher than average resistance to abrasion, important in the manufacture of tires and rubber goods subjected to constant hard usage. Very little is sacrificed in other properties to secure this added wear factor. Witco Black #1, a medium processing channel black, imparts to rubber equally good performance characteristics, especially in its long-sustained and efficient resistance to abrasion.

WITCO CHEMICAL COMPANY

MANUFACTURERS AND EXPORTERS

295 MADISON AVENUE, NEW YORK 17, N. Y.

Boston · Chicago · Detroit · Cleveland · Akron · London



If so—just turn your troubles over to INTERSTATE, the only plant devoted exclusively to expert, rapid and complete Banbury Mixer rebuilding.

Banburys bore the brunt of battle in the production of many vital materials which made Victory possible. Working night and day, without let-up, many a Banbury, today, is a casualty of the all-out effort, its efficiency far below par.

In the face of increasing production schedules, are YOU confronted with possible Banbury breakdowns? You know how costly that can be! Don't take any chances. Let INTERSTATE repair, or, rebuild your Banburys before it's too late. We'll send 'em back ALIVE, yes, as good as NEW, all set to take their places in the peace-time production line.

You can bank on that, because, here at INTERSTATE, we have the KNOW-HOW and we're equipped, as no other plant, with FACILITIES PLUS, to put war-weary Banburys back on the beam.

An example of INTERSTATE'S FACILITIES PLUS is pictured above. Here you see a Number 9 end frame in one of our horizontal boring machines which guarantees absolute precision work.

That's the way we do things at INTERSTATE. If we can be of help, wire, write or phone us today!

Address: 914 Miami Street, Akron, Ohio Phone: Jefferson 7970

SERVING THE RUBBER INDUSTRY

INTERSTATE WELDING SERVICE

Main Plant **AKRON, OHIO**

EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

REG. U.S. PAT. OFFICE



*NAUGATEX

chemicals

ACCELERATORS ANTIOXIDANTS MODIFIERS STABILIZERS THICKENERS

NAUGATUCK CHEMICAL

Division of United States Rubber Company

1230 AVENUE OF THE AMERICAS • NEW YORK 20, N.Y. BRANCHES: AKRON • BOSTON • DETROIT • NAUGATUCK



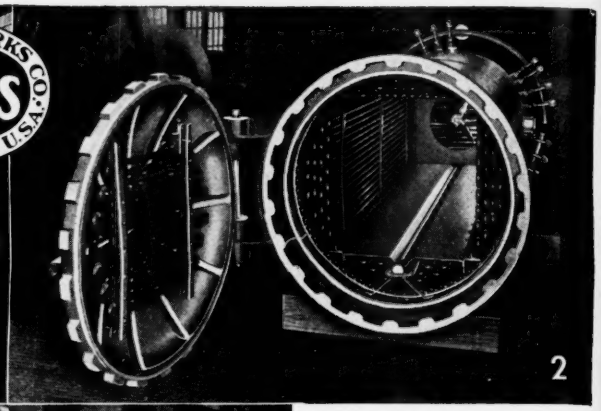


Fig. 1—15-ft. diameter by 45-ft. long horizontal vulcanizer with quick-opening door for vulcanizing rubber linings in large storage tanks. *Fig. 2*—Biggs vulcanizer with special heating manifolds and circulating fan; all sizes, various working pressures.

Biggs

VULCANIZERS and DEVULCANIZERS Have Served the Rubber Industry for More Than 45 Years



Fig. 3—vertical vulcanizer with quick-opening door. Door is handled by self-contained arm and gear-operating mechanism. Hand or motor operation.

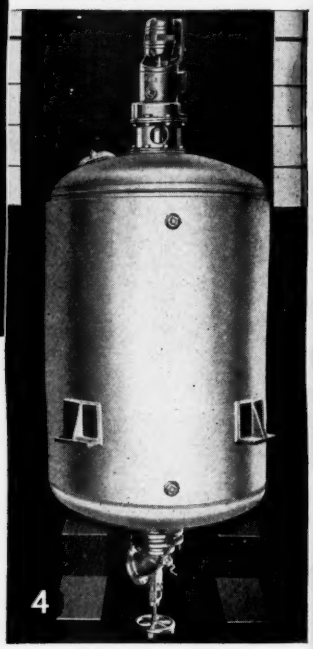
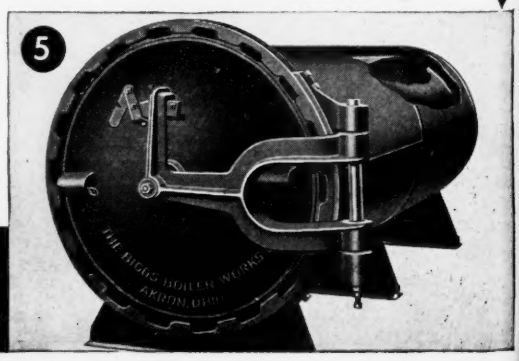


Fig. 4—high pressure heavy duty jacketed vertical devulcanizer with special agitator. Furnished in various sizes.

Fig. 5—horizontal steam-jacketed vulcanizer with hinge type quick-opening door; all sizes, for various working pressures. Welded construction throughout.

BIGGS-built vulcanizers and devulcanizers have occupied a prominent place in the development of the rubber industry since its inception. For more than 45 years Biggs has furnished single-shell and jacketed vulcanizers both vertical and horizontal, as well as many different types of devulcanizers to meet various requirements of the reclaim experts. . . . It is a far cry from the old days of bolted doors and riveted construction to Biggs modern all-welded units with quick-opening doors. Biggs vulcanizers and devulcanizers are available in all sizes and for various working pressures — with numerous special features. *Write now for our Bulletin 45.*



THE *Biggs* BOILER WORKS CO.
1007 BANK STREET, AKRON 5, OHIO, U.S.A.



Use UNITED BLACKS for best results

KOSMOS 20
DIXIE 20 — SRF

KOSMOS 40
DIXIE 40 — HMF

KOSMOBILE 77
DIXIEDENSED 77 — EPC



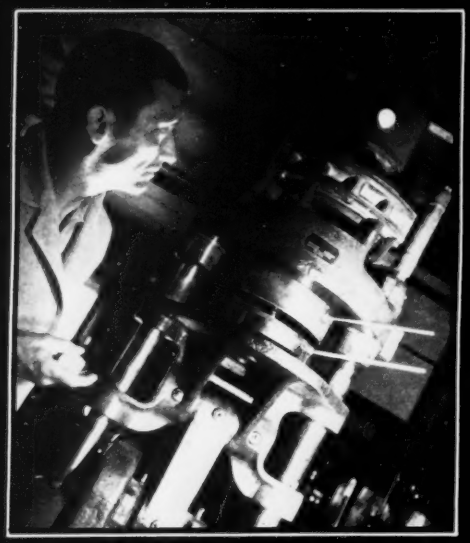
UNITED CARBON COMPANY, INC.

CHARLESTON, W. VA.

NEW YORK • AKRON • CHICAGO

At Your Service—

RESEARCH



STUDYING THE PROCESSING CHARACTERISTICS OF RUBBER WITH AN EXTRUSION PLASTOMETER

United research facilities and extensive laboratories, fully staffed with trained personnel, have these standing assignments:

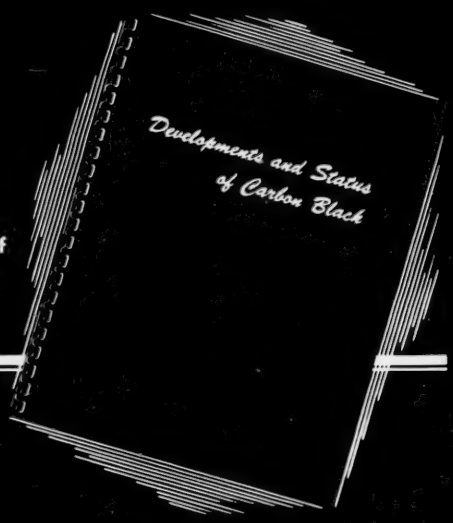
1. To control the carbon black production to specifications and uniformity.

2. To help solve problems connected with the use of carbon black.

3. To anticipate the needs and demands of industry for improved types of carbon black.

Let United's research organization work with you on your carbon black problems. Prompt service and the utmost cooperation rendered. Your inquiries will receive immediate attention.

Would you like to have a copy of "Developments and Status of Carbon Black?" It will be sent to you on request.



RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston, West Virginia

BAKER

PLASTICIZERS

impart

IMPROVED DRAPE*

TO FLEXIBLE PLASTICS SHEETS

***DRAPE** is the quality of hang, softness, "hand".

The improved drape of a coated fabric or an unsupported film made with **BAKER PLASTICIZERS** is immediately apparent to the eye and to the touch.

THE BAKER CASTOR OIL CO.

Established 1857

120 Broadway, New York, N. Y.

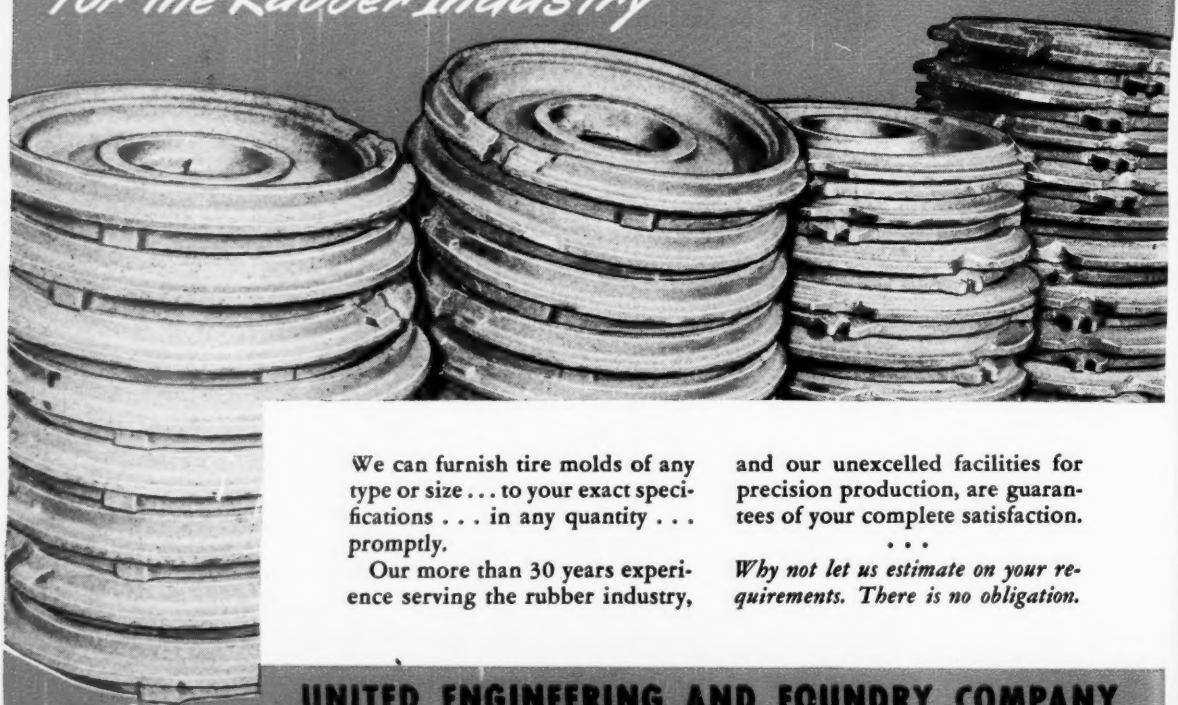
Chicago, Illinois Los Angeles, California



UNITED

MANUFACTURES TIRE MOLDS

for the Rubber Industry



We can furnish tire molds of any type or size . . . to your exact specifications . . . in any quantity . . . promptly.

Our more than 30 years experience serving the rubber industry, and our unexcelled facilities for precision production, are guarantees of your complete satisfaction.

• • •

Why not let us estimate on your requirements. There is no obligation.

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh · Vandergrift · New Castle · Youngstown · Canton
Subsidiary, Adamson United Company, Akron, Ohio
Affiliates, Davy and United Engineering Company, Ltd., Sheffield, England
Dominion Engineering Works, Ltd., Montreal, P.Q. Canada

The World's Largest Designers and Makers of Rolls and Rolling Mill Equipment



"Yes, this Flintkote material is *Just what we've been looking for*"

"I'm glad you sent that Flintkote man down to the lab, J D. He knew just what we needed.

"It seems he had worked out problems like ours before. We tried his recommendation in a pilot run yesterday, and it worked perfectly.

"Let's remember that fellow in the future. He told me that Flintkote makes a full line of aqueous dispersions . . . both rubber and resin . . . as well as a wide line of compounded synthetic rubber and resin latices."

Flintkote's Syntex* water dispersions and latex compounds are serving Industry in hundreds of applications today.

In many cases, Flintkote Service Technicians first studied requirements thoroughly. Then the Flintkote Research Laboratory worked right along with the user to develop a better, quicker, or less costly way to do the job.

This widely varied background of experience is at your service. Chances are it can offer you the solution to a troublesome production problem. Send us full details and we'll be glad to help you work out a practical solution.

*Reg. U. S. Trade Mark of Flintkote's Rubber Dispersions

Flintkote-Products for Industry

THE FLINTKOTE COMPANY • INDUSTRIAL PRODUCTS DIVISION
Atlanta • Boston • Chicago Heights • Detroit • Houston

FLINTKOTE INDUSTRIAL PRODUCTS

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
Los Angeles • New Orleans • Washington • Toronto • Montreal

See that your Maintenance Man has a complete set of these Data Sheets as issued. Previous Sheets will be sent free upon request.

MAINTENANCE DATA SHEET NO. 3

CALIBRATION OF SCOTT TESTERS (Con.)

In replacing ball bearings in the head, leave about 1/64" end play in the shaft; avoid tightening the check nuts too much.

Another cause of low reading may be in the pointer gears. Their teeth, also the bearings of the pinion shaft in the head, should be thoroughly cleaned. If gear teeth show excessive wear, gears should be replaced. In reassembling the head, a very small amount of oil should be placed in the shaft of the pinion and on the teeth of the gears.

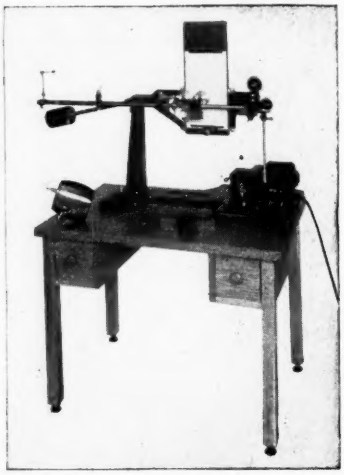
Undue friction may be caused by the condition of the chain supporting the upper clamp. This chain should be thoroughly cleaned and re-oiled with a few drops of light machine oil. It should also be checked for undue wear on the points that contact the head drum. The drum should be inspected to make sure that the chain is not causing excessive wear on its surface.

In cleaning the head, the teeth of the quadrant should be cleaned. Inspection may reveal that quadrant teeth have become bent, requiring straightening. The points of the pawls should be inspected to see if bent or dulled.

Special case: In the head of a tester having a guide for the upper clamp, friction can occur where the clamp rod passes through, if the guide has become bent or if the machine is not installed precisely vertical.

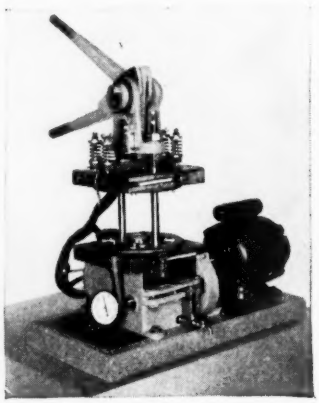
Data Sheets 2 and 3 have covered the usual sources of inaccuracy in the weighing head. If satisfactory calibration is not obtained after following these instructions, it is recommended that the head of the tester be returned to the manufacturer.

IP-2 INCLINE-PLANE *SCOTT TESTER



*Registered Trademark

The exclusive "Incline-plane" Scott Tester is expressly designed for testing rubber thread for tensile and hysteresis. Equipped for various capacities from 0 to 2,000 grams, it performs the desired tests automatically, producing a literal stress-strain chart of utmost convenience for ready reading and reference filing.

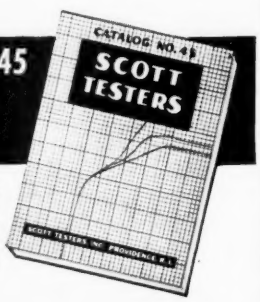


MOONEY SHEARING-DISC *VIS-COMETER

*Patented

Illustrated is Model NBS of the Mooney Viscometer, of which Scott Testers, Inc., are Sole Licensees. This machine provides consistent and reproducible test values. (Older models may be readily revised and rebuilt to NBS specifications.)

NEW CATALOG No. 45
AND TESTING HANDBOOK
JUST PUBLISHED
Request Your Copy



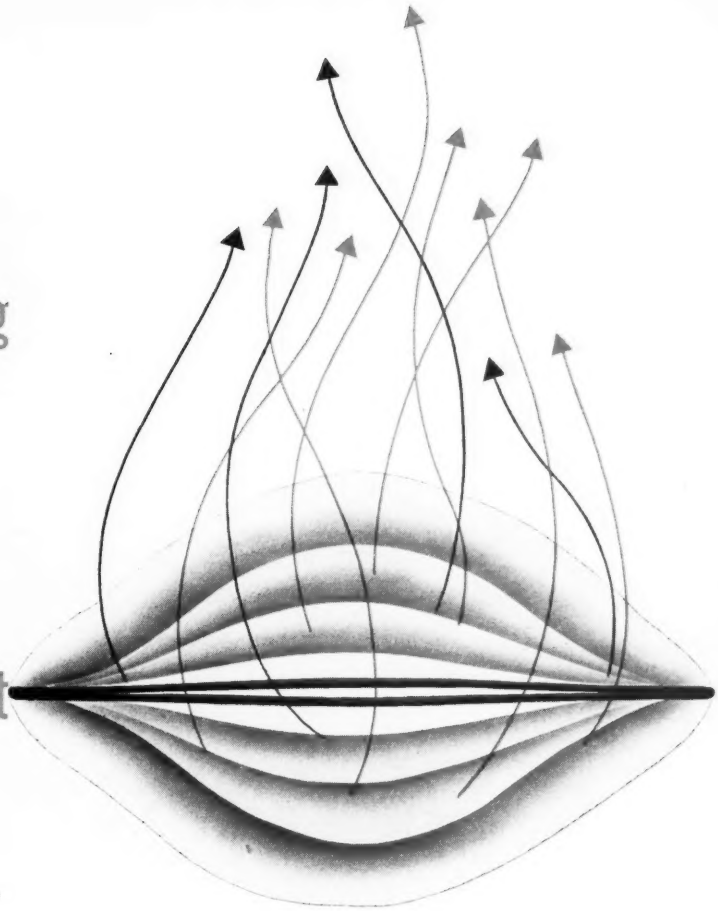
Contains full description of numerous standard physical testing methods and machines – plus a wealth of related reference data.

SCOTT TESTERS, INC.

90 Blackstone St., Providence, R. I.

Scott Testers – Standard of the World

where flexing builds up heat



use MONSANTO LAMPBLACK No. 10

Because Monsanto Lampblack No. 10 has demonstrated a definite superiority in smoothness . . . with consequent less friction . . . it is preferable in all rubbers, especially natural rubbers, where flexing is a factor.

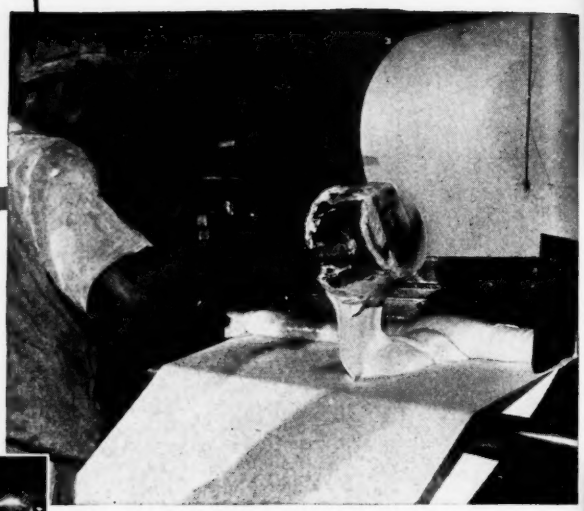
Also, this precision-produced black offers (1) maximum purity, (2) maximum carbon content, (3) uniformity, plus (4) a highly desirable blue-gray undertone.

Look into Monsanto's Lampblacks for rubber, now. Samples, complete information, and technical counsel may be had by addressing: MONSANTO CHEMICAL COMPANY, Merrimac Division, 30 Rockefeller Plaza, New York 20, N. Y.

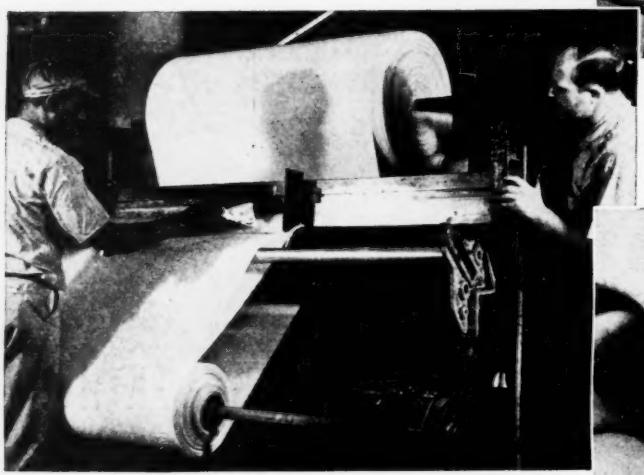
MONSANTO CHEMICALS
SERVING INDUSTRY . . . WHICH SERVES MANKIND

ONE SHOT COMBINING

Bone Dry Lamination . . .
Maximum Speed of Production . . .



▲ Application of UBS compounded GR-S Latex Combining Cement to fabric at coating knife. Note heavy viscosity and body, enabling efficient handling and application.



▲ Wet Combining in process in same Can Drier operation. Note rolling bank of UBS Combining Cement at knife and high solids film deposit of sufficient depth to enable wet stick.



UBS compounded GR-S Latex Combining Cement ➡ provides a positive, *one coat* bond, good flexibility, and excellent moisture resistant and ageing qualities.

Phone, wire or write for further information.

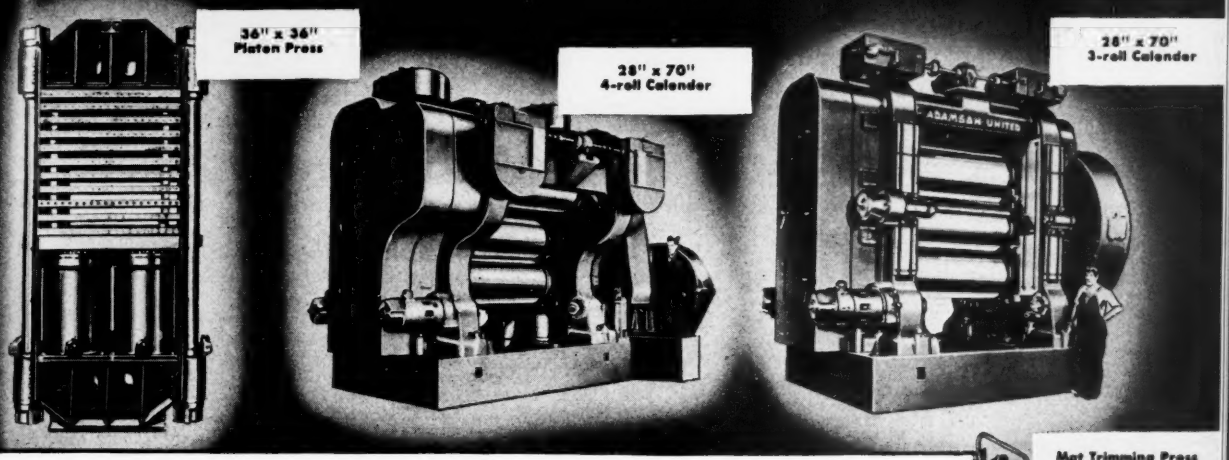
Address all inquiries to the Union Bay State Chemical Company, 50 Harvard St., Cambridge 42, Mass.

UBS

UNION BAY STATE
Chemical Company

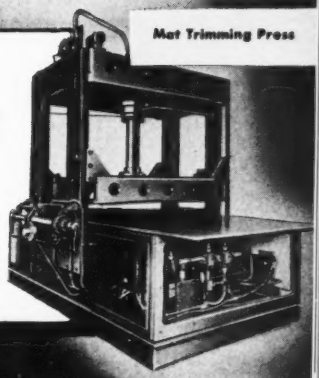
Serving Industry with Creative Chemistry

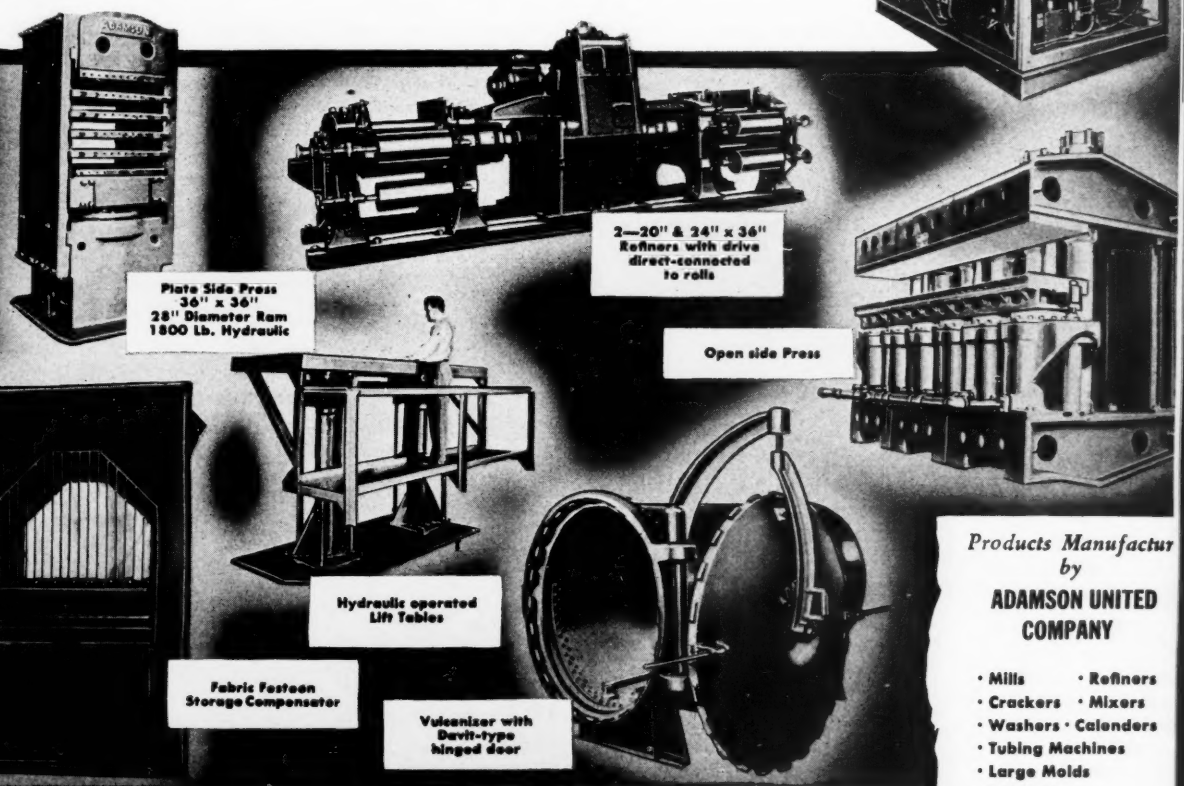
ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS



For Every Rubber Processing Purpose

ADAMSON UNITED EQUIPMENT





Building machinery for conventional or special rubber processing requirements has been our business for half a century.

This wealth of experience, fortified by consistent research and a knowledge of the industry's needs, have enabled us to pioneer many "firsts" in rubber manufacture.

If you contemplate the purchase of additional equipment to meet today's unusual demands, or if you are faced with the problem of creating new processes for unusual product requirements, consult us.

The experience and abilities of our engineers are at your service.

Products Manufactur by

ADAMSON UNITED COMPANY

- Mills
- Refiners
- Crackers
- Mixers
- Washers
- Calenders
- Tubing Machines
- Large Molds
- Pot Heaters
- Vulcanizers
- Autoclaves
- Hydraulic Presses
- Multi-Platen Presses
- Automatic Curing Presses
- Belt Curing Presses
- Compression Molding Presses
- Plywood Presses
- Auxiliary Equipment

ADAMSON UNITED COMPANY

AKRON 4, OHIO

SUBSIDIARY OF
UNITED ENGINEERING AND
FOUNDRY COMPANY

Plants at
Pittsburgh, Vandergrift, New
Castle, Youngstown, Canton

Four Divisions One Purpose



WHEN you see the N-S trade-mark on a product, it is your assurance of unvarying quality. For this trade-mark, regardless of which division of National-Standard it identifies, stands for one overall policy.

This policy stresses—first, the importance of completely understanding the customer's problems. Second, that the engineering experience and research facilities of each division be made fully available to solve specific problems. Third, to always continue development work that will result in still further improvements in customers' products and methods of manufacture.

The products listed at the right indicate the wide scope of services offered by the four divisions of National-Standard Company. Your letter to any one of these will bring quick, personalized service.

NATIONAL-STANDARD COMPANY
NILES, MICHIGAN

Wire Braids flat and tubular in Steel or other metal. Tapes and Specialized Wire Products for Tire Beads, Steam Hose Armor, Reinforcement for Oil Well Drilling Hose. Braided Covering for Flexible Tubing, Aircraft and Tank Radio Shielding. Stranded Wire for reinforcing Flat and V Belts. Braided Covering for Electrical Cables. Drawn wire in small sizes down to .002, of Steel, Aluminum, Brass, Monel, Nickel Silver, Stainless Steel, Phosphor Bronze and other Alloys.

THE ATHENIA STEEL COMPANY, DIVISION
CLIFTON, NEW JERSEY

Cold Rolled, High Carbon Flat Steels in widths of 1/16" to 6½", Thickness .0015 to .062 Custom-made Steels—.60 Carbon and higher. Entire range of Annealed, Hard Rolled, Black Tempered, Tempered and Polished or Tempered and Polished with Blue or Straw Colored finish, Best quality Small Flat Springs.

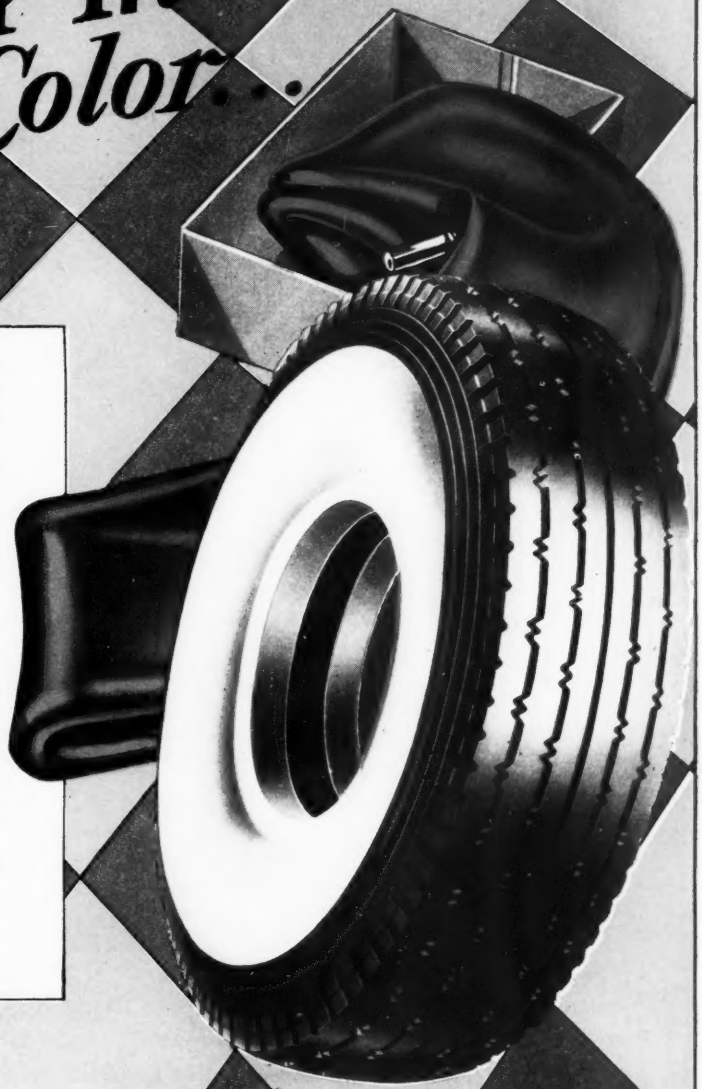
WORCESTER WIRE WORKS, DIVISION
WORCESTER, MASS.

High quality Wire in small diameter sizes, down to .006. Round, Low and High Carbon Steel. Annealed, Hard Drawn, Tempered, Bright, Liquor Finish, Tinned, Copper Coated, Cadmium Coated, Galvanized.

WAGNER LITHO MACHINERY CO., DIVISION
HOBOKEN, NEW JERSEY

Complete lines of automatic equipment—designed, manufactured and installed for can companies and others using sheets in the metal decorating trade. Individual units consist of Roller Coating Machines, Conveyor Type Ovens and Auxiliary Equipment for tandem operation with lithographing presses, etc.

it's your move to Color...

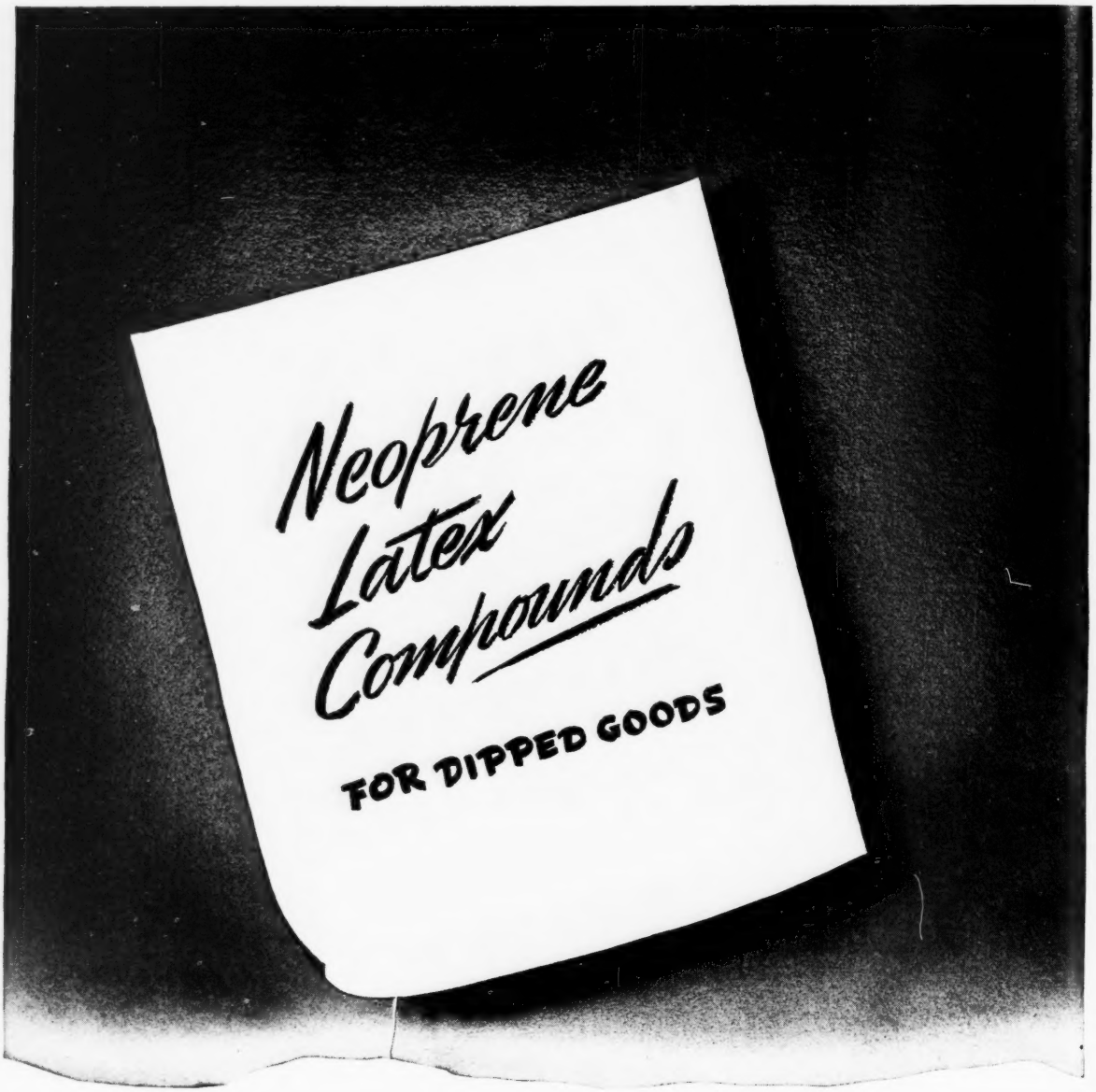


THE RETURN of red tubes from war-time oblivion is setting the pattern for *moves to color* in many directions... In Drug Sundries, Mechanical Goods, and Footwear, COLOR will stimulate the change to stable peace-time markets . . . The return of white side-wall tires is a looming event for 1946 . . . In all of these production trends SILENE EF is a dominant factor because it is assuring greater success in color compounding . . . SILENE EF is essential in many non-black compounds of natural or synthetic rubber to give them the needed processing and good cured physical properties unobtainable when whitings or clays are used alone as the loading pigment.

SILENE EF

STANDARD Chemical Company
General Offices: AKRON 8, OHIO

New England: 335 Chamber of Commerce Bldg., Boston, Mass.
Mid-Atlantic: Broad Street Bank Bldg., Trenton, N. J.
Mid-West: 2724 W. Lawrence Ave., Chicago, Ill.
Pacific Coast: 1248 Wholesale St., Los Angeles, Cal.



General Latex has developed several simplified neoprene latex compounds for dipped goods. These compounds are thoroughly "tried and proven" and in current use in many factories. Neoprene latex offers advantages not found in natural rubber latex—more particularly, high resistance to oxidation, sunlight, oils, and chemicals. If you are considering the manufacture of any dipped product, we suggest that you get in touch with our technical staff. Their years of experience with natural and neoprene latex will prove very helpful in formulating a neoprene compound custom-made to your specific needs.

General Latex
& CHEMICAL CORP.
666 MAIN STREET, CAMBRIDGE, MASS.

Vultex Division — Verdun Industrial Buildings, Verdun, Montreal, Quebec

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

rayon *defies* the fire in a tire



makes tires SAFER-BETTER

Greater safety, longer life and superior performance, whether the tires are made of natural rubber, synthetic rubber or combinations of both—that's rayon's contribution to tire-making.

Scientists know that tires heat up as they roll and that this heat shortens tire life, causes blowouts and road failure. Rayon "defies the fire" in two ways: first, a lighter tire always runs cooler—and rayon, being stronger, makes a lighter tire possible; second, rayon maintains higher tensile strength as it gets hotter.

Bus and truck fleet owners provide the practical proof of these laboratory findings. They report that rayon cord tires give longer life, greater mileage and reduce road failures and blowouts.

So much for rayon in general. In particular, Industrial Rayon makes Tyron rayon yarn, cord and fabric. In addition to the advantages found in all rayon, Tyron also provides unequalled uniformity, thanks to the extra controls resulting from Industrial's exclusive Continuous Process.

TYRON rayon for tires

Made by INDUSTRIAL RAYON CORPORATION
Cleveland, Ohio



"There Isn't Any Santa Claus"

SKELLYSOLVE Quality Can't Be Bought at a Lower Price

Would you expect to buy a Cadillac at Chevrolet prices? Certainly not, and just as logically, you wouldn't expect to get Skellysolve quality, Skellysolve dependability, and Skellysolve service in lower priced naphthas.

Whenever you encounter a naphtha claimed to be "as good as" or "better than" Skellysolve, but which is offered at a lower price, ask yourself: "Can I be certain of its quality and purity? Will it do the job effectively and economically? Can I count on rapid delivery and good service on all orders? Can its supplier help me out in a pinch? If its dependability, quality, and service are just as satisfactory as Skellysolve, why is it necessary for this other solvent to be offered on a 'cut price' basis? Will the supply be dependable year after year? Can I be sure of a uniform product? Will this 'cut price' solvent be available a year or two from now? If I do not obtain prompt delivery or if inferior material is received, how much will it cost in my operating results and how much will it embarrass my shipping schedules?" There isn't any question about the quality, dependability, and service of Skellysolve, because its record for the past 16 years proves its excellence. What's more, Skelly is constantly expanding its facilities in order to produce more Skellysolve as the demand grows.

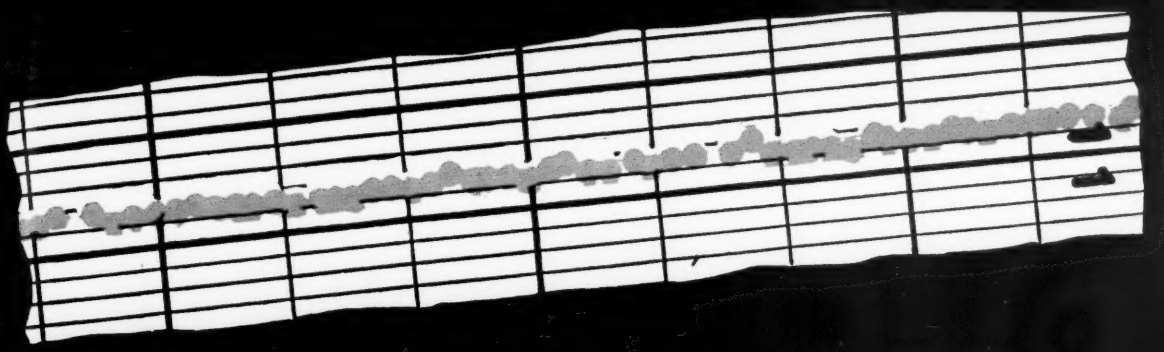
Remember—Skelly Oil Company was the first large volume producer of hexane, heptane, and octane type solvents, and has faithfully served the rubber, oil and fat, ink, lacquer, and other industries with dependable Skellysolve during all these years.

SKELLY

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL COMPANY

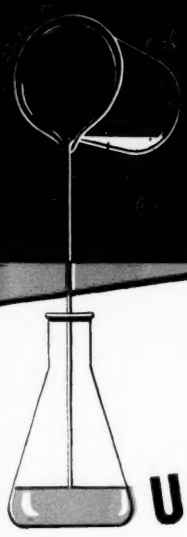
SKELLY BLDG., KANSAS CITY, MISSOURI



Peace-time demands for NEOPRENE COMPOUNDED PRODUCTS

give new importance to CALCINED MAGNESIA

made under controlled temperature



IT'S UNIFORM

1. UNIFORM wetting power and ease of dispersion
2. UNIFORM dispersion with improved stabilizing effect
3. UNIFORM quality maintained in moisture-proof packaging

"Give us more Neoprene compounded products." Every day the demand increases as war-time experience with Neoprene becomes known.

The sharp rise in the use of Neoprene for many new products makes it doubly important for Neoprene compounders to know the importance of selecting a uniform Calcined Magnesia.

And one vital factor in the uniformity of Calcined Magnesia is controlled temperature in manufacturing. Baker gives you this plus with specially built electric ovens. This electrically controlled calcining process gives definite uniformity and also eliminates possibility of oxide contamination from products of combustion.

The indexes of chemical purity for Calcined Magnesia are extremely high. The indexes for iron and calcium are extremely low. The processing of neoprene is still a very sensitive operation. That is why you will be interested in the distinctive features of Baker's Calcined Magnesia, shown in the panel.

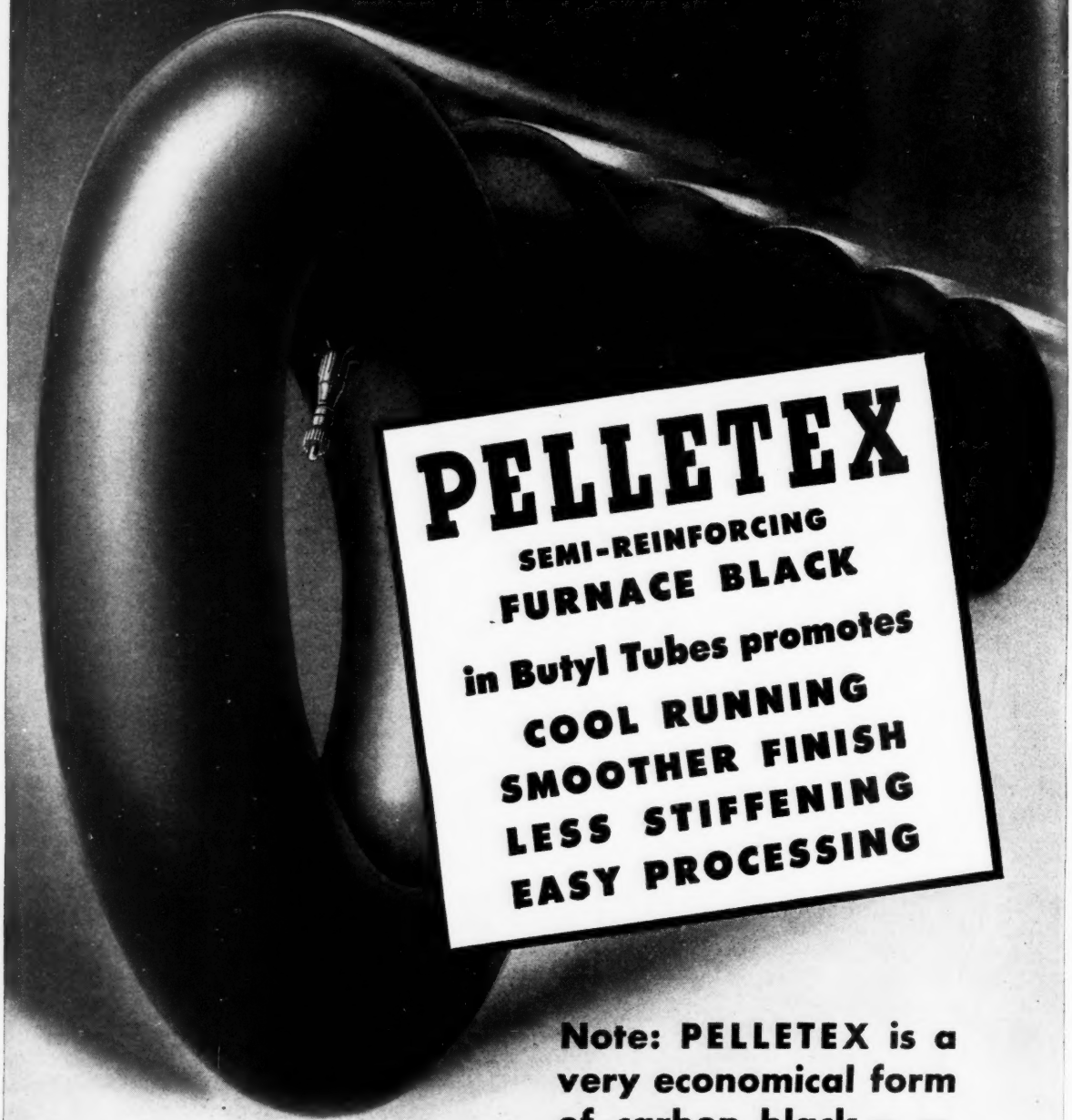
We urge you to test Baker's Magnesium Oxide (Neoprene grade). Test it for its ease of dispersion—its ease of compounding of stock—its rate of cure — its tensile strength — and its plasticity. Learn why Baker's light Calcined Magnesia is better. Send for free samples.

J.T. Baker Chemical Co., *Executive Offices & Plant:* Phillipsburg, N.J.
***Branch Offices:* New York, Philadelphia, Boston and Chicago.**

Baker's *Light* CALCINED MAGNESIA

(MAGNESIUM OXIDE)

BUTYL TUBES ARE HERE TO STAY!



PELLETEX

SEMI-REINFORCING
FURNACE BLACK
in Butyl Tubes promotes
COOL RUNNING
SMOOTHER FINISH
LESS STIFFENING
EASY PROCESSING

Note: PELLETEX is a very economical form of carbon black — —

MANUFACTURER • DISTRIBUTOR

GENERAL ATLAS CARBON CO.
PELLETEX
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HERRON BROS. and MEYER
NEW YORK, N.Y. AKRON, OHIO
RUBBER
H AND M
PIGMENTS Chemicals

3 BULLETINS YOU SHOULD HAVE . . .



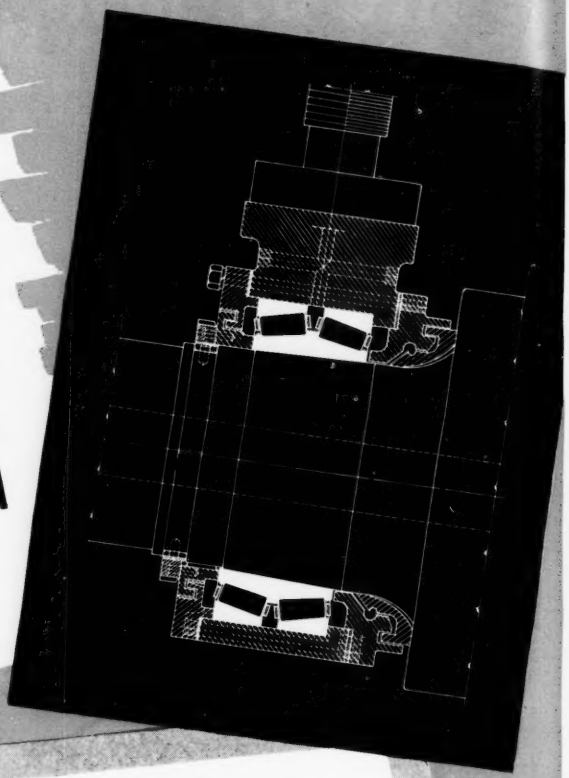
These bulletins give complete information on three important groups of synthetic resins. Specifications, application suggestions and other useful data are given. If you do not have them in your files, write for copies today.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP.
CLAIRTON, PENNSYLVANIA
Plants at Clairton, Pa. and Chester, Pa.
Makers of: **Coumarone Resins · Coal Tar Solvents · Styrene Resins · Rubber Plasticizers · Reclaiming Oils · Terpene Resins · High Solvency Naphthas · Solvent Oils**
Distributors to the Rubber Industry, STANDARD CHEMICAL COMPANY · Akron, Ohio

For More Rigid, More Accurate Calenders

Timken

BALANCED PROPORTION BEARINGS



The essence of accuracy in rubber calenders is closely-controlled contact constantly maintained from end to end of the rolls.

This demands maximum roll rigidity — minimum roll deflection, under all load and temperature conditions.

By making possible (a) excess roll neck diameter and strength (b) excess radial, thrust and combined load capacity, Timken D-I-T Type Balanced Proportion Bearings as shown in the drawing, help provide the rigidity and endurance necessary for dependable, top notch performance.

In addition, Timken Bearings enable extremely fine adjustments to be made during installation, thus assuring minimum vertical movement of the calender rolls regardless of operating temperature.

The Timken Bearings furnished for these calender roll mountings are of the ultra-precision type. Rolls can be ground when necessary without removing the bearings from the roll necks, inaccuracies in the O.D. of the roll necks or roll barrels being compensated for by the precision of the bearings themselves.

To make sure of getting all these advantages in your calenders make sure the trade-mark "TIMKEN" appears on every bearing you use.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

HARFLEX PLASTICIZERS

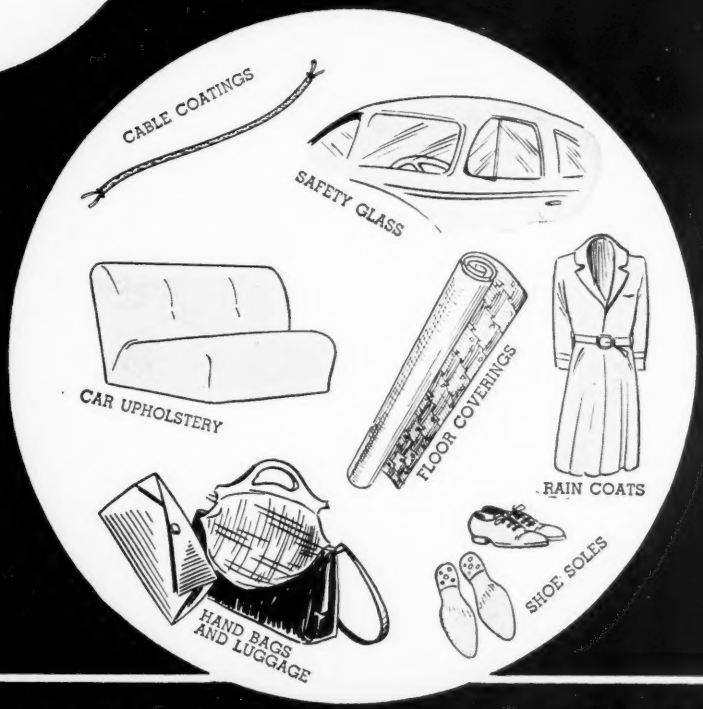
The RIGHT TYPE FOR YOUR PRODUCT

For

VINYL RESINS

SYNTHETIC RUBBERS

CELLULOSE ESTERS



We offer you in the HARFLEX Series a *complete* line of Plasticizers for Vinyl Resins, Synthetic Rubbers and other Plastics and Elastomers.

We have developed a variety of Plasticizers, each with its own special combination of properties. This enables the user to select that particular product most suited to his own needs.

Consult us if you have a Plasticizer problem. Our technical staff will be glad to assist you.

BINNEY AND SMITH CO. DISTRIBUTOR TO THE RUBBER INDUSTRY

HARDESTY CHEMICAL COMPANY, INC.

HARCHEM

41 EAST FORTY-SECOND STREET, NEW YORK 17, N.Y.

McNEIL TUBE CURING PRESSES



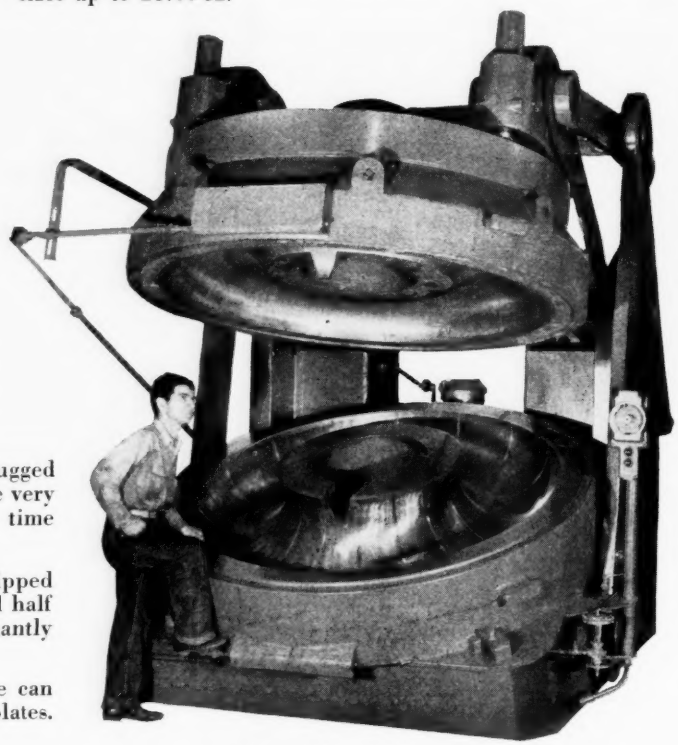
Model 110 — 45″ — 15.

in three popular sizes, for faster closing, quick inflation.

Model 110 — 45″ — 15, shown at left, is suitable for the full range of passenger size tubes, plus truck sizes up through 11:00-20.

Model 190 — 55″ — 18, is suitable for the full range of smaller truck sizes, plus giant sizes up through 14:00-24.

Model 400 — 75″ — 25, shown below, will handle the larger regular truck sizes, plus farm implement sizes and earth mover sizes up to 24:00-32.



Model 400 — 75″ — 25.

Speedy closing and fast inflation speed up tube production. The 45″ press, for instance, closes in less than three seconds and, with our control, the tube is inflated the instant the two mold halves come together.

These presses are equipped with the rugged McNEIL design automatic timer, which can be very accurately adjusted, and in which curing time changes can be made in a matter of seconds.

All presses, because of their speed, are equipped with a safety bar which precedes the top mold half during its closing stroke and stops the press instantly if anyone gets in the way.

Most of the tube molds already in existence can be used in McNEIL presses without adapter plates.

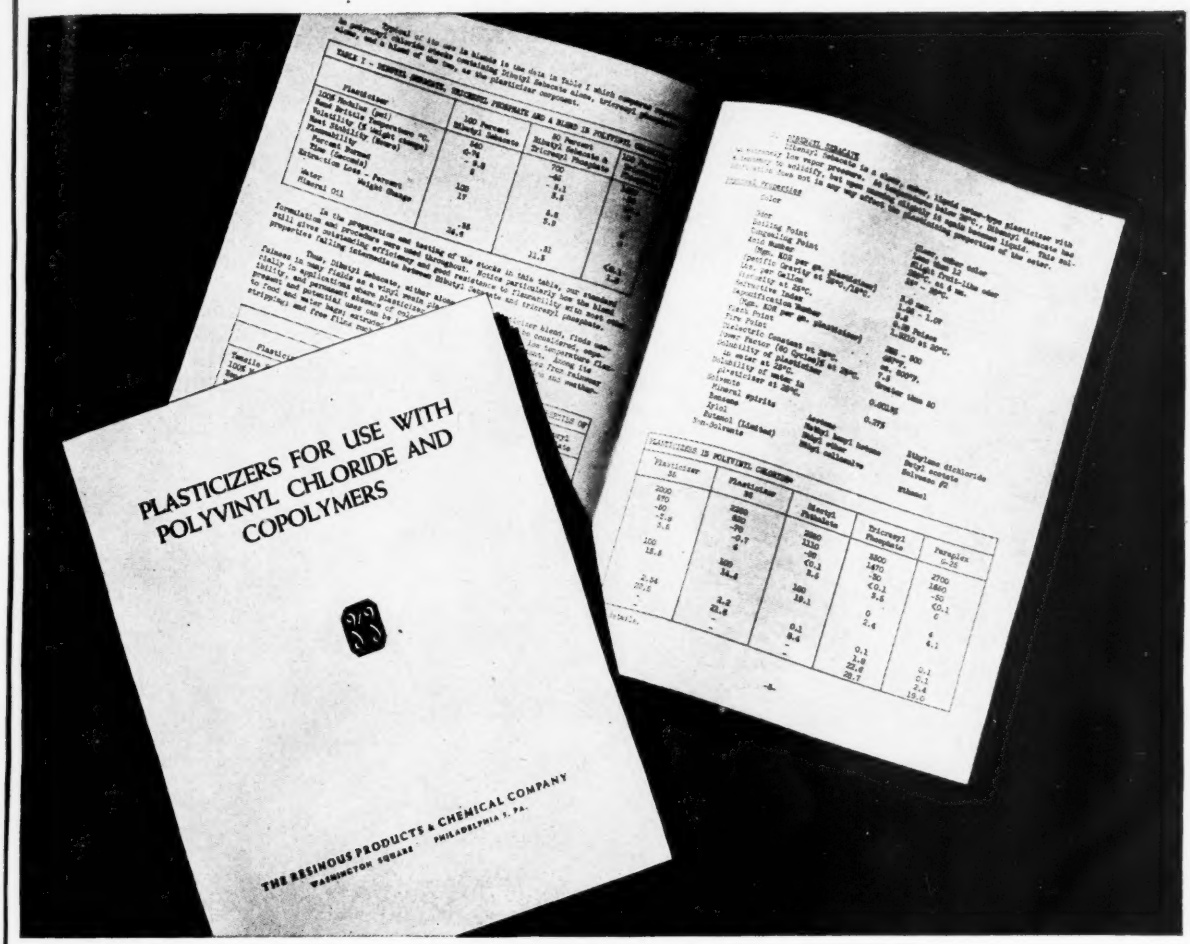
All the experience and engineering skill of the McNEIL organization is at your call to help you increase efficiency and speed while lowering production costs. For tomorrow's production, check with McNEIL today.

MANUFACTURING AGENTS
GREAT BRITAIN—Francis Shaw & Co., Ltd., Manchester, England.
AUSTRALIA and NEW ZEALAND—Chas. Ruwolt Proprietary, Ltd., Victoria, Australia.

McNEIL AKRON

The McNEIL Machine & Engineering Co.
96 East Crosier St. Akron 11, Ohio

RUBBER WORKING MACHINERY • INDIVIDUAL CURING EQUIPMENT FOR TIRES, TUBES and MECHANICAL GOODS



Do you have this information in your files?

Here's a bulletin containing complete technical information on the properties and uses of the following plasticizers produced by THE RESINOUS PRODUCTS & CHEMICAL COMPANY:

DIBUTYL SEBACATE—a highly efficient plasticizer, widely used for extreme low temperature applications.

DIBENZYL SEBACATE—well suited for electrical stocks requiring low temperature flexibility and minimum volatility.

DIOCTYL SEBACATE—this plasticizer offers all the advantages of dibutyl sebacate, but in addition has much lower volatility.

DICAPRYL PHTHALATE—a widely used general purpose plasticizer available at low cost.

PLASTICIZER 35—a very useful secondary, low cost plasticizer.

PLASTICIZER 36—a good general purpose type plasticizer combining excellent efficiency, low volatility and flexibility at extremely low temperatures.

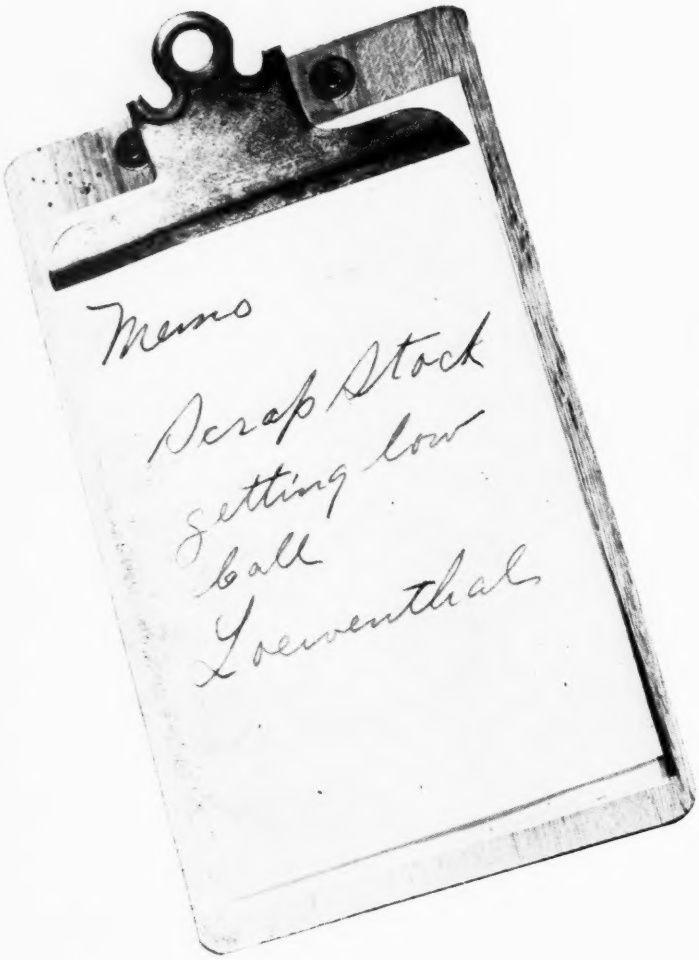
PARAPLEX G-25—a unique polymer type plasticizer possessing outstanding permanence, non-migratibility, and resistance to heat, oil and ultraviolet radiation.

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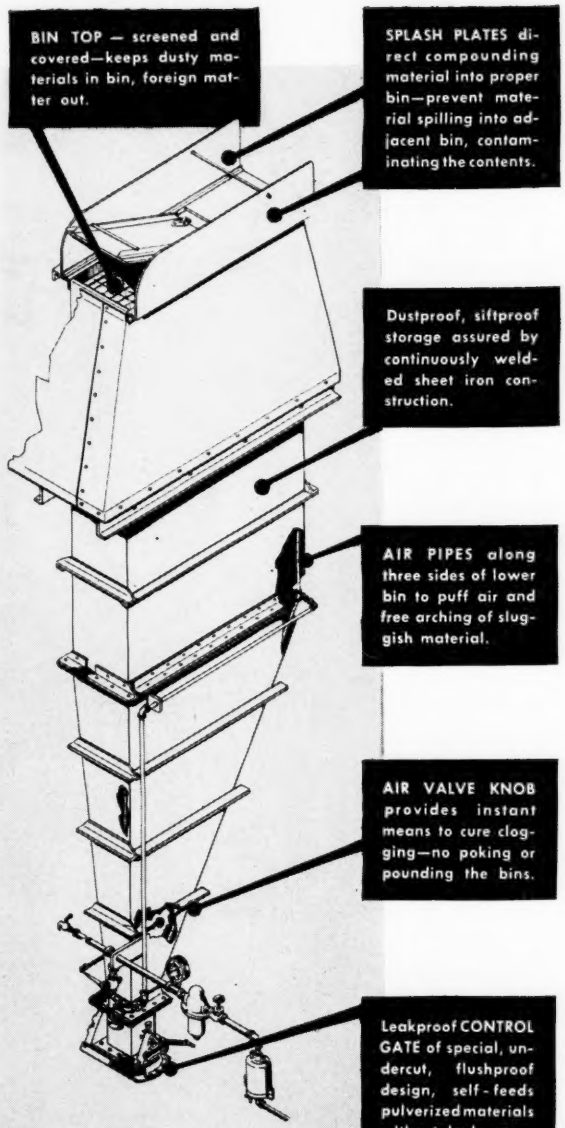
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The chute and control gate of Richardson Gate Bins are specially designed to assure proper flow of compounds easily, quickly—without flooding and leaking. And materials flow *continuously* from bin to gate; a flip of the air-valve knob instantly relieves any clogging—sends a puff of air to break up arching of materials.

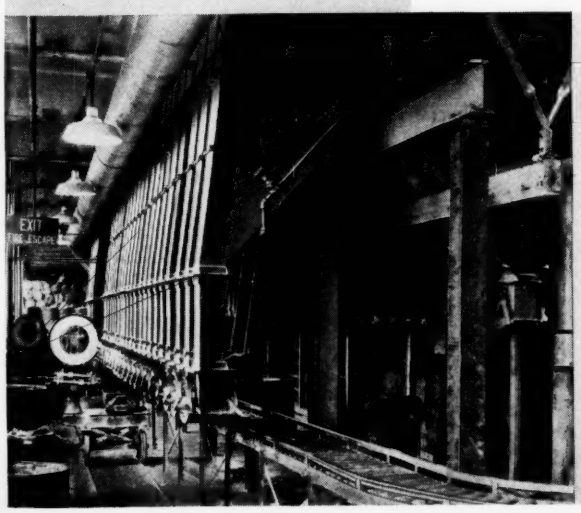
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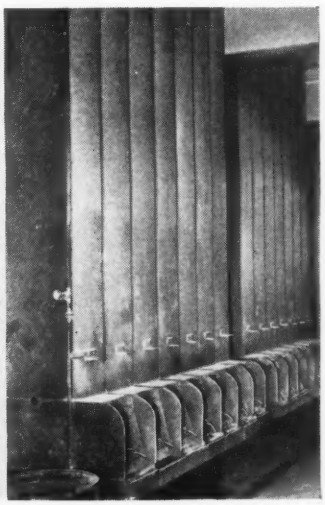
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B.R.V. is the highest boiling of any of the liquid softeners produced by Barrett from coal-tar oil for the rubber industry.

Specific Gravity	1.14 to 1.18 at 25°C/25°C
Specific Viscosity, Engler, 50 ml. at 50°C	5.0 to 10.0
Insoluble in Benzene, % by weight	0.5 maximum
Water, % by volume	0.5 maximum
Distillation, % by weight	
To 300°C	7.0 maximum
To 315°C	3.0 to 12.0
To 355°C	28.0 maximum

B.R.V. is particularly recommended for use in

GR-S — Reclaiming

GR-A

Availability

Tank cars and 50-55 gallon non-returnable steel barrels

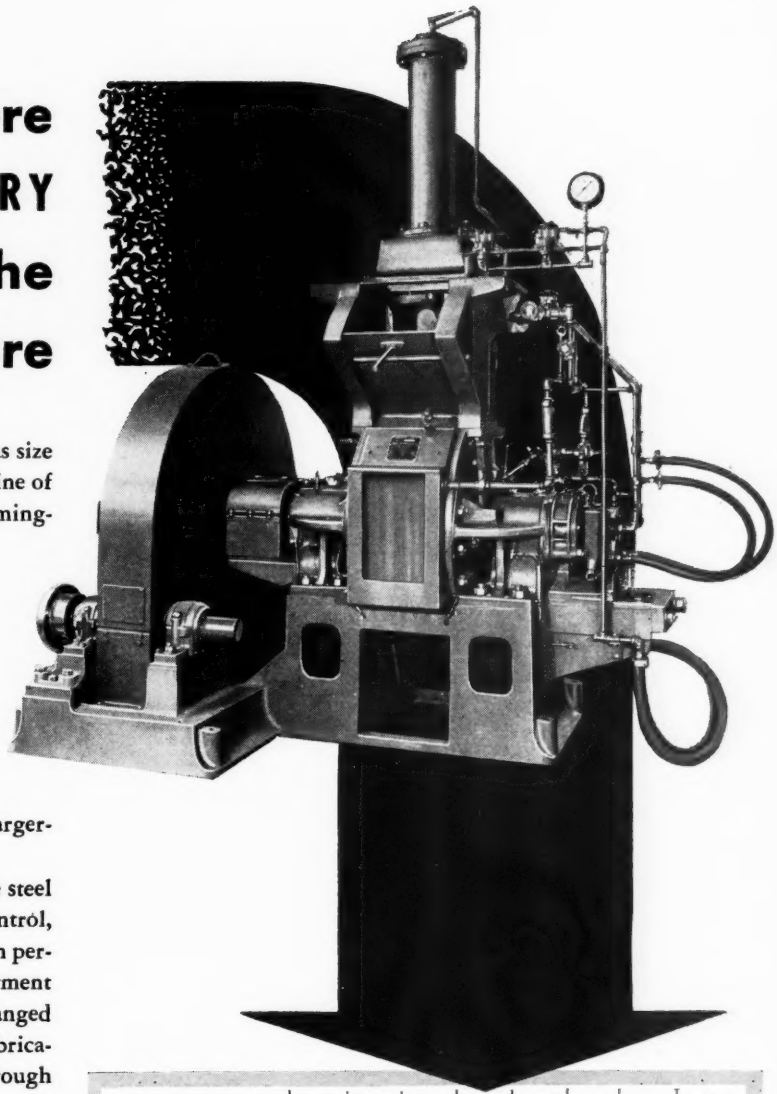
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Here's Where THIS NEW BANBURY fits into the mixing picture



A new Banbury mixer, known as size 1-A, has been added to the well-known line of efficient processing units that Farrel-Birmingham builds for the rubber and plastics industries.

Developed originally for mixing small batches of Neoprene stock, the 1-A is identical in design with the larger Banburys and duplicates their mixing conditions and processing efficiency. It has the same built-in abrasion-resistance—the same means for control of batch uniformity as the larger-capacity units.

Important construction details include steel mixing rotors, cored for temperature control, coated with abrasion-resistant material on peripheries and fitted with end-thrust adjustment . . . cast steel mixing chamber sides arranged for heating or cooling . . . force-feed lubrication of dust stops where rotors pass through housing . . . potentiometer pyrometer with thermocouple in direct contact with batch . . . telechron-operated cycle timing device.

Write for complete details of the 1-A or any of the other Banbury mixers listed in the chart. Full information and engineering help will be supplied without obligation.

Size of Machine		B	00	1	1-A	3-A	9	11	27
Net Volume of Chamber—Cubic Inches		103	263	1193	1193	4315	11443	14940	34144
Approximate Liquid Capacity	Chamber only	½ gal.	1 gal.	5 gal.	5 gal.				
	Chamber and Neck	.8 gal.	1⅜ gal.	8½ gal.	8½ gal.				
Approximate Capacity Stiff Paste Pounds per Batch	Factor x Specific Gravity	Sp. Gr. x 2.5	Sp. Gr. x 4	Sp. Gr. x 24	Sp. Gr. x 24				
	No. of lbs.	2-4	5-10	30-60	30-60				
Approximate Capacity Rubber Stocks Pounds per Batch	Crude Rubber	2	4	24	24	85	225	300	600
	1.25 Specific Gravity Stock	3	5	27-33	27-33	100-115	250-300	340-410	700-800
	1.50 Specific Gravity Stock	4	6	32-40	32-40	120-140	310-360	400-500	850-1000
	2.00 Specific Gravity Stock	5	8	44-52	44-52	160-180	410-500	550-650	1100-1500
Motor Horsepower	Standard Single Speed	12½	15	50	50	150	200	300	500
	Standard and Double Speed	12½/25	15/30	50/100	50/100	150/300	200/400	300/600	

FARREL-BIRMINGHAM CO., Inc.
ANSONIA, CONN.

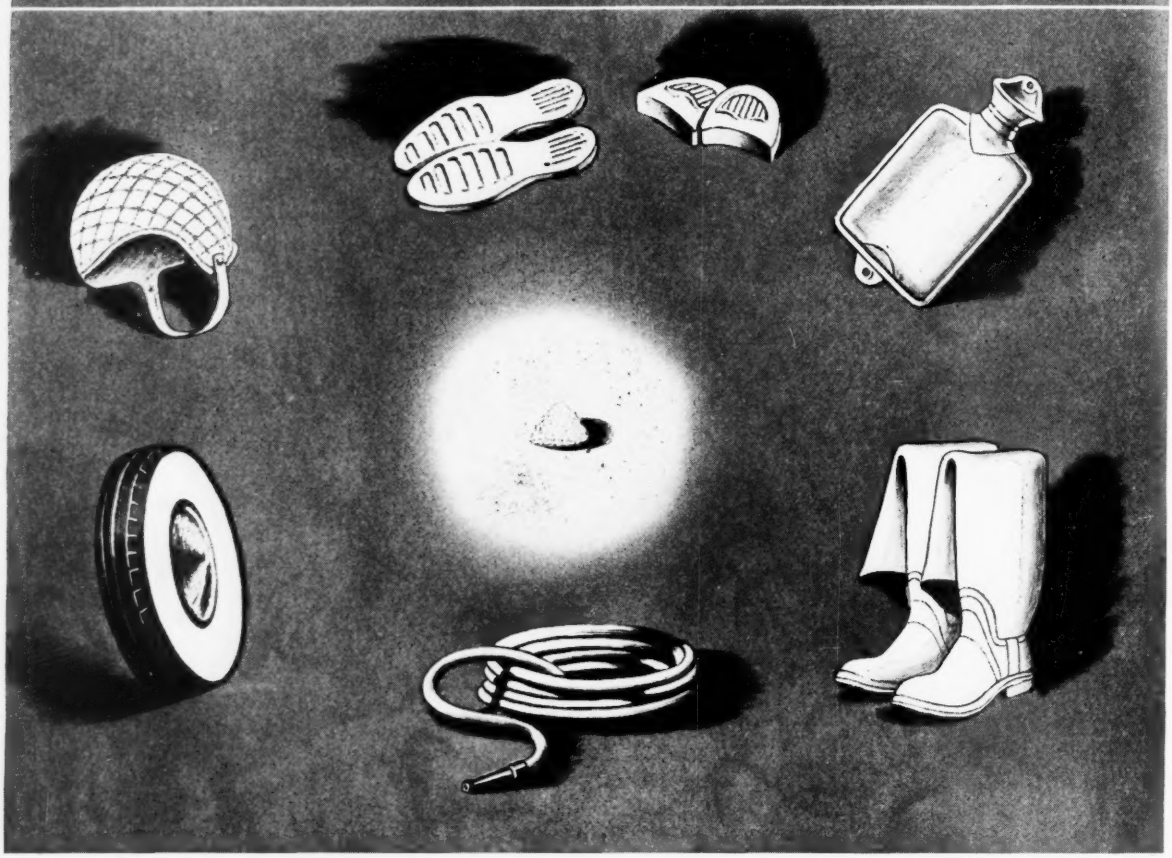
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FB-317

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The whitening and brightening effect of TITANOX pigments makes possible the highest degree of whiteness obtainable in rubber stock. Furthermore, because of the high tinting strength of TITANOX, any desirable degree of whiteness can be attained with a proportionate minimum of pigmentation.

Different grades of TITANOX have been developed to give rubber varying degrees of tensile strength, elongation, flexing, tear and abrasion resistance, as well as dielectric qualities.

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NEVILLAC 10° Plasticizer

SPECIFICATIONS AND PROPERTIES

Specific Gravity at 15.6/15.6°C	1.075 to 1.10
Weight per gallon (average)	9.15 pounds at 15.6°C
Distillation Range	Essentially between 300°C and 370°C
Refractive Index at 25°C	1.597
Flash Point	Not below 290°F. No red label required
Color	Light amber ★
Iodine Number (average)	44
Acid Number	Less than 5
Saponification Number	Less than 5
Molecular Weight (average)	240
Appearance	Honey-like oil, very viscous
Odor	Phenolic
Corrosion (Copper Strip)	No darkening, but very slight solvent action on copper
Viscosity, absolute at 25°C	235 poises

★ Color of Nevillac 10° has been improved and is much lighter than offered over last few years.

NEVILLE

Nevillac 10° Resin, also known as PHO, is a most versatile material with respect to solubility and compatibility. This material is soluble in all commonly used solvents, except water and glycerol. It is soluble in ethylene glycol.

It is compatible with most synthetic resins including cellulose esters and ethers (nitrocellulose, ethylcellulose, cellulose acetate, etc.), vinyl acetate, vinyl butyral, zein, nylon, and partly compatible with vinyl acetate and chloride copolymer.

Due to the fact that Nevillac 10° is a hydrindylphenol derivative, it possesses many of the chemical characteristics and much of the solvent power of hydroxy-type solvents such as phenols, and aromatic hydrocarbon type solvents such as benzol or toluol. For this reason, it is capable of acting as a mutual solubilizing agent for resins, oils, cellulose derivatives, and the like, which are normally incompatible.

It will pay you to investigate this widely adaptable plasticizer. Request your gratis sample today.

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A-17-A

Technical Bulletin No. 21 — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

Heat-Resisting GR-S Insulation for CV Cures

COMPOUND	
GR-S	100.0
"Tuads"	1.75
"Tetrone A"	1.25
Coumarone-indene Resin	15.0
Mineral Rubber	20.0
Akroflex C	2.0
Heliozone	4.0
Fine Particle Size Surface Treated Whiting	75.0
Clay	50.0
Zinc Oxide	75.0

ACCORDING to A.S.T.M. Standard Specification D754-43T for RH (heat resistant) type insulation for wires and cables, the unaged tensile (min.) and elongation (min.) shall be 700 psi. and 300% respectively for a GR-S compound, with 50% (max.) depreciation in both properties after aging for 20 hours in the Air Pressure Heat Test, at 260°F. (127°C.) and 80 pounds air pressure.

A stock accelerated with a combination of 1.75 parts of "Tuads" and 1.25 parts of "Tetrone A" is outstanding in its ability to satisfy the A.S.T.M. specification requirements.

ORIGINAL RESULTS

Time of Cure Min. at 310° F.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of 200%
1	1120	785	215
2	1200	745	255
3	1280	715	255
4	1370	685	260
5	1360	695	255
10	1210	635	255
15	1280	655	255

20-HOUR AIR PRESSURE HEAT TEST*

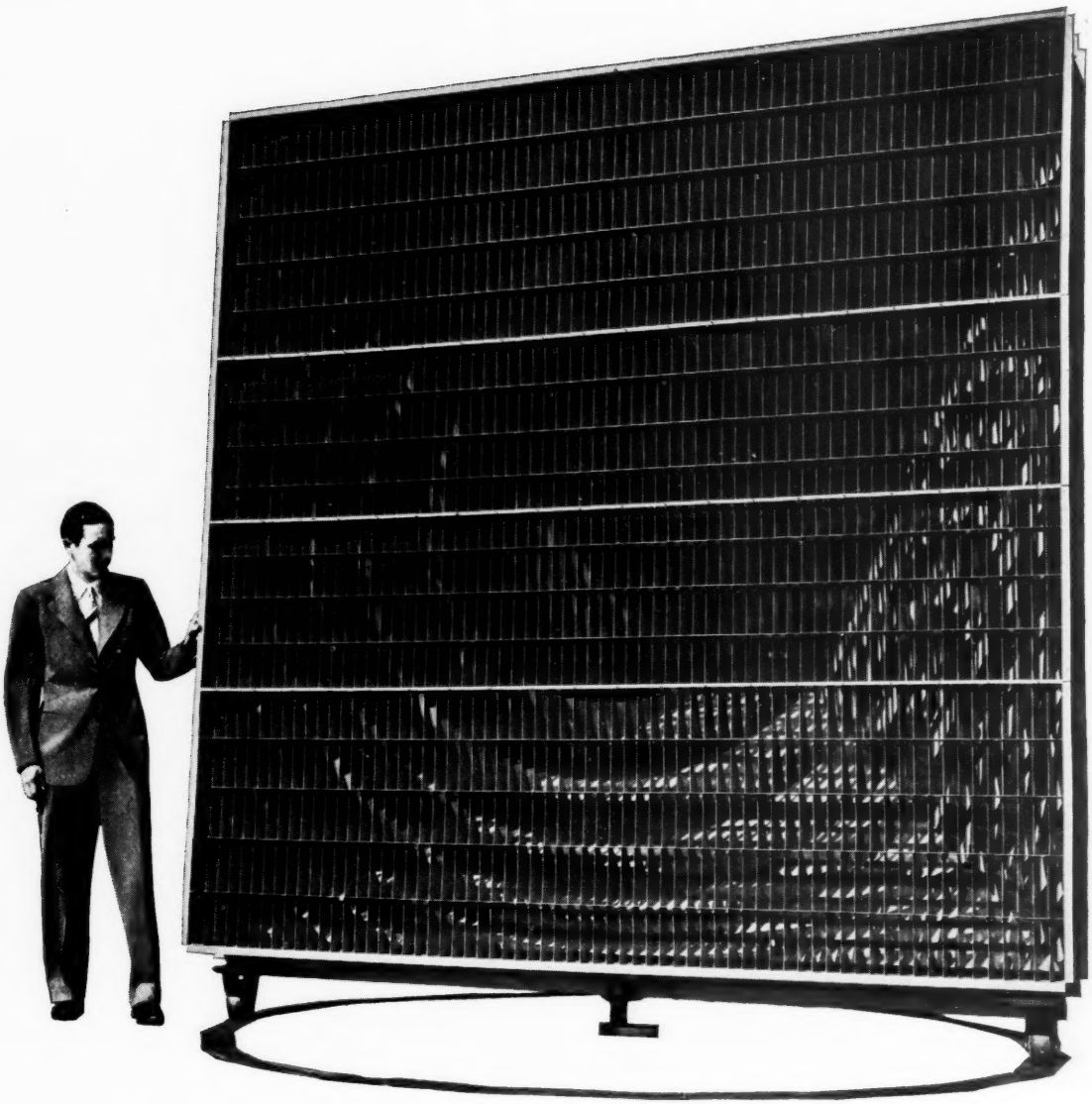
Time of Cure Min. at 310° F.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of 200%
1	1225	495	575
2	1270	495	580
3	1280	515	585
4	1280	515	625
5	1250	545	550
10	1190	575	575
15	1170	595	515

* 260° F. Temp. 80 Lbs. Air Pressure.

Uniform Quality
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A "SEARCHLIGHT" TO FOCUS RADIO WAVES

In the new microwave radio relay system between New York and Boston, which Bell Laboratories are developing for the Bell System, giant lenses will shape and aim the wave energy as a searchlight aims a light beam.

This unique lens—an array of metal plates—receives divergent waves through a waveguide in the rear. As they pass between the metal plates their direction of motion is bent inward so that the energy travels out as a nearly parallel beam. At the next relay point a similar combination of lens and waveguide, working in reverse, funnels the energy back into a repeater for amplification and retransmission.

A product of fundamental research on waveguides, metallic lenses were first developed by the Laboratories during the war to produce precise radio beams.

This "searchlight" is a milestone in many months of inquiry through the realms of physics, mathematics and electronics. But how to focus waves is only one of many problems that Bell Telephone Laboratories are working on to speed microwave transmission. The goal of this and all Bell Laboratories research is the same — to keep on making American telephone service better and better.

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EQUALS

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DAY Rubber Cement Mixer

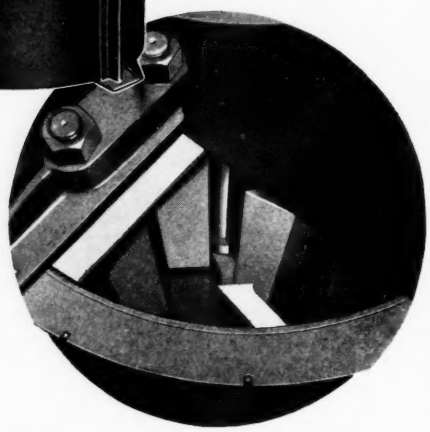
Hero Type



USED EXTENSIVELY IN RUBBER PLANTS THROUGHOUT THE COUNTRY

BELOW

INTERIOR VIEW SHOWING HEAVY AGITATOR BLADES



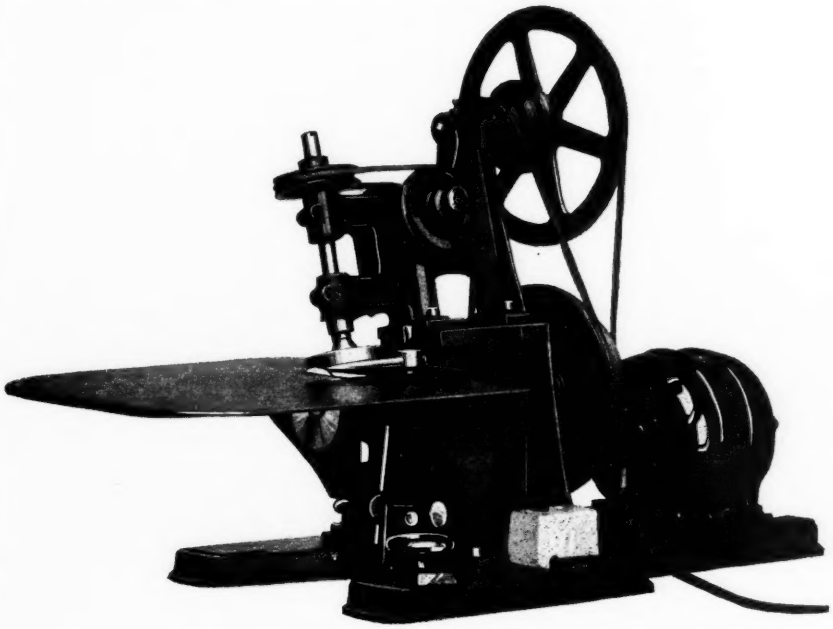
The DAY Hero Rubber Cement Mixer requires much less time for dissolving a batch than does the older type of mixer. Four sets of stationary blades, spaced at 90 degrees, extend downward from the top frame. Two sets of blades, spaced at 180 degrees, extending upward from heavy agitator arms located at the bottom of vertical shaft, rotate with the shaft.

The lower picture shows the blade section of the DAY Rubber Cement Mixer, illustrating the close clearance between the stationary and the moving blades, which shear the rubber into smaller and smaller pieces, constantly exposing more surface to the action of the solvent.

THE J. H. DAY COMPANY

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WYEX is the preferred tread pigment for the world's finest tires.

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May, 1946

Volume 114 Number 2

A Bill Brothers Publication

INDIA
RUBBER WORLD
NATURAL & SYNTHETIC

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The Outlook for Natural Rubber[1]

Wallace E. Cake[2]

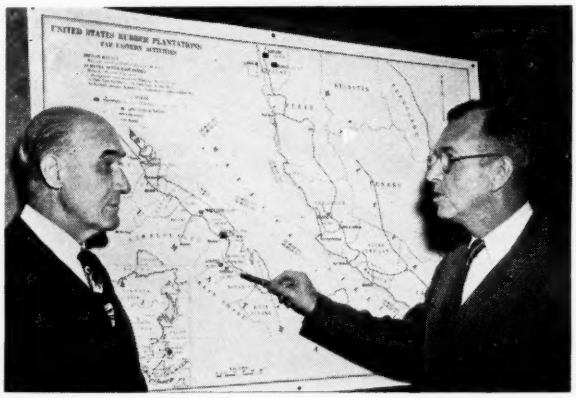


Fig. 1. W. F. Cake Indicating to J. W. Bicknel, Managing Director of U. S. Rubber's Plantation Division, the Location of the Internment Camp on Sumatra from Which He and Other American and British Internees Were Released after V-J Day

THE major portion of the world's potentional production capacity of natural rubber is located in British Malaya and the Dutch East Indies. Since both these countries were occupied by the Japanese for a period of about 3½ years during the war just ended, I believe you will be interested in an account of what happened to the Far Eastern plantations and the equipment thereon during the course of the war; also included are a few remarks on the possibility of resumed production and shipment from the plantations.

For the past 23 years I have been associated with the plantations of the United States Rubber Co. in Sumatra and Malaya where we had planted areas of 72,871, and 28,770 acres, respectively. Immediately following the end of hostilities, I had an opportunity to pay a short inspection visit to our main properties in Sumatra; I was also able to gain considerable information about other areas in the east coast districts from the accounts of eye witnesses.

So far as possible, it is my plan to confine this discussion to Far Eastern plantations in general; in certain instances, however, my information regarding present conditions is more complete for our own properties than for plantations in general, and in these cases I will tell you about the situation on our own estates. From this you will be able to gain by inference some idea of the general situation now obtaining on the rubber plantations in the Far East.

Period Prior to Japanese Invasion

Neither Sumatra nor Malaya produced enough food to provide for the resident population of these respective countries. Long before the war it became obvious that owing to blockade and shortage of shipping, a conflict in the Pacific would shut off outside sources of food supply to Sumatra and Malaya. In order to prepare for this contingency both countries set up fairly heavy stocks of food reserves. To all intents and purposes this food procuring was about all that was done in Malaya; in Sumatra, however, the Dutch introduced an extensive program of food-stuff planting. As a result of this difference in procedure, the food shortage in Malaya was much more acute than in Sumatra during the war as well as during the period immediately following the cessation of hostilities. The food planting program in Sumatra, however, resulted in some loss to the area of planted rubber in that island.

In Netherlands India, the Dutch Government stipulated the amount of food-stuff planting that had to be undertaken by the various plantation companies, depending upon the population of the district and the size of the estates. So far as possible, of course, the quota was met by planting the food crops on reserve land; however, because some companies had no reserve land, also since most available reserve land had first to be cleared of secondary jungle — time as well as availability of labor being important factors in conducting this work—it was impossible to carry out the whole program in this manner.

Accordingly a second method was introduced, and this consisted of interplanting food crops in immature stands of rubber; this procedure is feasible as long as the young rubber trees are not old enough to form a closed crown canopy which would cut off the light necessary for the growth of the food plants. Actually, food interplanting was conducted in some immature areas that were too advanced from the standpoint of light availability, but this situation was corrected by pruning in the crowns of the rubber trees. Many estates contained extensive immature stands of rubber—replantings as well as new extensions — and from

[1] Presented before the Philadelphia Rubber Group, March 8, 1946.
[2] Assistant managing director, plantations division, United States Rubber Co., New York, N. Y.



Fig. 2. Pulling down Trees prior to Replanting on Sumatra Estates; Note Density of the Ground Cover

nearly all of these, one, two, or even three crops of food stuffs were obtained by interplanting. This procedure, of course, permits retaining the original stand of rubber; the rubber trees, however, are somewhat retarded in growth by competition from the food plants, but it is expected that they will overcome this disadvantage after a time, especially if accorded adequate manuring treatment.

Even with both the foregoing methods of food-stuff planting, some estates were still short of their quota and therefore had to fill out the program by cutting down a certain amount of old rubber in order to obtain the remaining land required. These operations were mostly confined to areas of poor old rubber which should be included in the replanting programs of the various companies during the first years following resumption of normal operations; accordingly, the loss of the rubber felled for this purpose does not constitute a serious disadvantage from the standpoint of the plantation industry. I do not know the exact area of old rubber felled in the Netherlands Indies for the purpose of this food-stuffs planting; on our own estates it was in the range of 5,000 acres.

Vernielings[3]

Quite early the Dutch authorities decided that any military resistance in Sumatra would be futile and accordingly introduced a "scorched earth policy" for the island. There were many changes of plan and much confusion in carrying out this policy, and the action taken varied considerably in

[3] (This is a Dutch word meaning demolition).



Fig. 3. Section of U. S. Rubber's Sumatra Estates, with Land Planted with Seedling Rubber Trees in the Upper Right and Middle, and Land Prepared and Ready for Planting in the Lower Half and at Left

different districts. To serve as an illustration, I am listing the items of destruction which were actually carried out on our Sumatra properties either before or on the day of invasion:

1. All the latex stored at our Boenoet factory, consisting of 403,611 gallons' cream, was drained into the Boenoet River.

2. From the Belawan latex shipping installation, the following stocks were drained into the harbor: 368,950 gallons' cream; 113,702 gallons' centrifuged latex; 173,356 gallons' normal latex.

3. Vital parts of various pieces of machinery were removed, packed in cases, and dispatched to an undisclosed destination. It was the intention to ship these to Australia for safe keeping until after the war when they would be returned; this turned out to be impossible because of shipping shortage which resulted from Japanese air activity.

4. Aluminum partitions from the smoked sheet coagulating tanks were removed and dumped in the Poeloe Radja River.

5. Motor cars in the district were brought to the Boenoet factory where their carburetors, distributers, spark plugs, and batteries were removed and destroyed.

6. Large, irregular holes were made in all latex storage tanks at Boenoet as well as in the narrow-gage tank cars, thus rendering them unfit for immediate use.

7. Two large and important bridges used by our narrow-gage railroad, over the Silau and Kwala Piasa rivers, were blown up by dynamite, causing a collapse of one bay in each.

8. At Belawan our latex storage installation was dynamited to accomplish a rather complete job of demolition.

During the Fighting

Since there was practically no resistance to the Japanese invasion of Sumatra, damage to plantations and equipment in this island due to actual fighting was at a minimum. In Malaya, however, the situation was different although even here the damage from fighting was less than might have been expected. So far as known, the only important damage to property of our company which resulted from actual fighting occurred during a Japanese air raid at Port Swettenham when a bomb struck our latex shipping installation at that port.

Period of Japanese Occupation

Plantations

In Sumatra the Japanese continued and extended the program of food-stuff planting that was started by the Dutch authorities before the war. During the first years of Japanese occupation they confined the removal of rubber for this purpose to the older and poorer stands which, in the ordinary course of events, would have been included in early replanting programs; accordingly, these losses should not be regarded as particularly serious. During the last year of occupation, however, owing to a shortage of labor, the Japanese commenced removing young rubber instead of old—it being easier to cut down a small tree than a big one —when the Japanese military demanded a sharp increase in the area planted to food-stuffs. As a result of this change of procedure, there was lost an appreciable area of selected, high-yielding budded stock, some of which should have been capable of production at maturity in the range of 2,000 pounds of rubber per acre per year.

A complete census of rubber lost in Sumatra as a result of the war is not yet available. However we recently received a census pertaining to 639,888 acres of plantation rubber in the east coast district. These estates have lost a total of 78,904 acres, comprising 12% of the area. Of the rubber removed, 11,115 acres consisted of young, high-yielding stock, this being about 2% of the total area or approximately 14% of the stands removed. On the same estates the Japanese replanted rubber to the extent of 4,453 acres.

I paid a five-day visit to our estates on the east coast of Sumatra starting on September 27, last, and therefore can tell you of the losses which we sustained. Our plantations in Sumatra lost a total of 15,000 acres of rubber, 2,000 acres consisting of young high-yielding stands; while the balance

of 13,000 acres was comprised of poorer areas of old rubber and included the 5,000 acres which we ourselves cut out for food growing prior to the invasion. In general, the situation regarding rubber lost varies considerably in different districts; some plantations remain practically untouched, while there are reports of other estates from which the trees have entirely disappeared.

It is also interesting, of course, to describe the condition of the stands of rubber which remain in Sumatra. In March and April, 1943, the Japanese interned the Dutch planting staff which, up to that time, had been allowed to remain on the estates in most districts. While the estate staff was still on the job, considerable was done to keep the plantations in good condition. However, after the internment of the Dutch planting staff and continuing until the end of hostilities, the plantations were accorded no attention whatever in the way of upkeep, and, as a result, all sorts of undesirable undergrowth had become established in the stands of rubber. The situation in this respect was particularly bad in areas of young rubber where creepers had climbed to the tops of the trees and closed over to form a dense ceiling which was sufficiently heavy in some instances to pull down the rubber trees. Fortunately such mechanical damage was not very common on the Sumatra plantations. However the establishment of such undergrowth is bad for rubber since it offers serious competition to the trees; from the appearance of certain young stands which I visited I would estimate that their development has been retarded anywhere from six months to 1½ years. It is urgent, of course, that the estates be cleaned up of their undesirable undergrowth as soon as possible; this work had actually been started by the Japanese following the end of hostilities, and in a few cleaned areas which I visited the general appearance was not too bad.

In Malaya the Japanese introduced a program of foodstuff growing—similar to Sumatra—which accounts for the loss of some rubber from the estates on that side. Further trees were lost in Malaya owing to a general order for the removal of all growths along both sides of important roads which might serve as places of hiding for Chinese irregulars and from which sniping might be done. Lastly, damage to young stands due to lack of upkeep, i.e., creepers climbing the trees and pulling them over, was apparently greater on estates in Malaya where appreciable areas were lost from this cause. Several estimates have been made as to the total area of rubber lost in Malaya during the period of Japanese occupation. From an early census, immediately after the war, it was estimated that not more than 5% of the estate rubber in Malaya had disappeared; from a later estimate, recently published in American papers, it is now thought that the total rubber lost in Malaya amounts to about 10% of the plantation area before the war. As a matter of interest, I might mention that the Malayan plantations of our company have lost a total of about 3,000 acres, consisting mostly of young high-yielding stock. This represents a little more than 10% of our planted area in Malaya.

Equipment

Immediately following the invasion the Japanese set about to repair the damage to equipment resulting from the application of the "scorched earth policy" in Sumatra. As an illustration of what they accomplished in this direction, I will outline the repairs conducted at our central factory in Boenoet, Sumatra. Earlier in this discourse I told you of the items of destruction carried out on our Sumatra properties either before or on the day of invasion; by the beginning of May, 1942, the Japanese had found and returned to the Boenoet factory 59 cases of vital parts which had been shipped away before the invasion. There are still a few cases of vital parts unaccounted for, but most of the important items have been returned and assembled in their appropriate places.

Most of the aluminum partitions from the smoked sheet coagulating tanks, which had been thrown in the Poeloe Radja River, have been recovered and returned to the factory.

All of the latex storage tanks, as well as the narrow-gage tank cars, have been repaired by electric welding.

The railroad bridge over the Silau River has been repaired and is again suitable for handling complete trains; the bridge over the Kwala Piasa River has also been repaired, but in a temporary manner only, so that it is not strong enough for the passage of locomotives.

On the other side of the picture, while the Japanese estate authorities were engaged in repairing the damage resulting from the application of the "scorched earth policy" in Sumatra, throughout the course of the occupation the Japanese military requisitioned certain materials and equipment for use elsewhere on the island. Again for purposes of illustration, I will mention the following important items which were so removed from our Sumatra properties:

1. Two 80-ton, three 40-ton, and a number of smaller tanks from various departments of the factory.
2. About 50 miles, comprising half, of the narrow-gage track from the estates.
3. Three narrow-gage locomotives. (There remain three locomotives in good condition.)

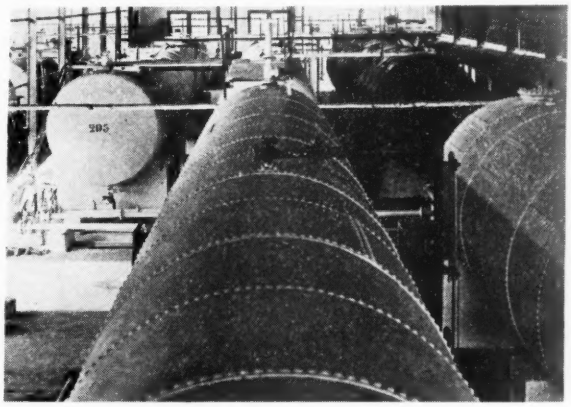


Fig. 4. Steel Tanks at Central Factory of U. S. Rubber, Boenoet, Asahan, Sumatra, for Storage and Processing of Latex

Such removal of equipment from estates was general throughout the areas occupied by Japan. In the case of our own factory, complete records are available as to the disposition of all equipment and materials sent away so that there is some chance of securing their return; actually, before my departure, the Japanese had already started to return the narrow-gage track that had been removed from the estates.

On some of the outlying estates the situation regarding equipment is not so favorable; this remark applies particularly to Malaya where some estate factories have lost their machinery, motors, tanks, piping, valves, etc., etc.; in many instances, i.e., where records of disposition have not been kept, the chances of recovery are not particularly good.

As a matter of interest, I might mention that, according to the report of an eye-witness, my company's latex loading plant at Port Swettenham is almost completely demolished; 11 out of the 13 latex storage tanks have disappeared; while all piping and machinery have been destroyed.

Labor

In my opinion shortages in available labor will comprise the factor which really limits the rate at which production can be resumed on the rubber plantations in the Far East. Both Sumatra and Malaya have to use imported estate labor, Javanese in Sumatra and British Indians for Malaya. The labor present in both countries throughout the period of occupation was treated very badly indeed by the Japanese. In Sumatra estate laborers were taken from their homes and forced to work on the construction of roads, railroads, and airdromes in remote parts of the island. The same was done in Malaya; while, in addition, many workers

were taken to slave camps in Burma and Siam. In all instances they had to work very long hours at a minimum wage, got very poor and little food, were accorded appalling living accommodations, and received no medical attention. Health conditions were deplorable; there was high incidence of malnutrition disorders as well as malaria and infectious diseases. The sick were forced to work until they dropped at their job and were only sent to hospital, when this was done at all, when ready to die. The mortality in these labor camps was extremely high; in one instance that was told me, only 24 out of an original 5,000 survived to return to their homes. On an average it is estimated that not more than 40 or 50% of the normal labor force is now available to the estates of Sumatra and Malaya. The survivors, of course, are in poor physical condition and are badly in need of good food, medical attention, and clothing. Accordingly, large scale labor recruiting is indicated for the near future. When it is realized that about 23,500 men are necessary for the full-out operation of our company's 101,000 planted acres, the magnitude of this job for all the rubber estates of Sumatra and Malaya becomes apparent.

Staff

I do not have any complete figures as to what happened to the estate staffs of the rubber plantations in Sumatra and Malaya during the war, but I can tell you of the situation about our own people. Before the war the American and European staff on the plantations of U. S. Rubber Co. comprised 125 men. Twenty-one of these escaped from the Far East before the occupation, but the remaining 104 were caught by the Japanese and had to face the music. Those who survived the original fighting were placed in prisons or camps as civil internees or prisoners of war; some were forced into slave labor battalions in Siam and Burma. There were 14 deaths among our staff members, 11 from our Sumatra plantations and three from Malaya. Of the survivors, most are fit for immediate work; a few require rest and medical attention before they can resume their posts, and still fewer will never be able to work on the plantations again. Even those who are comparatively fit, however, will require leave from the tropics before very long in order to recover completely from their war experiences. Some companies were luckier than ours in the matter of staff mortality while others were less fortunate; as stated above, I do not yet have average figures for the whole industry.

Resume' and Possibilities of Resumed Production

Although the rubber plantations of Sumatra and Malaya have lost appreciable portions of their planted acreage, extensive areas of rubber still remain in both these countries: namely, about 88% and 90%, respectively, of the prewar stands. To take our own case for example, even though we lost 15,000 acres of rubber in Sumatra and 3,000 acres in Malaya, our plantations in those two countries still comprise more than 57,000 and 25,000 planted acres, respectively, or a total of 83,000 acres.

It is true that the rubber which remains will require considerable attention in the matter of upkeep, but in some areas this work has already been started—in Sumatra by the Japanese following cessation of hostilities; in Malaya by the British Military Administration and later under the auspices of the M.R.E.O.C. (Malayan Rubber Estates Owners Co.). As soon as the cleaning up has been done, there is no reason why the trees cannot be tapped.

On many plantations there are still available sufficient knives, cups, cup-hangers, spouts, etc., etc., so that tapping equipment will not constitute a limiting factor in resuming production.

There is considerable variation as to the damage suffered by the factories on different rubber estates. Our central factory at Boenoet, Sumatra, is in comparatively good condition and could be used for some production as soon as the political situation allows resumption of work. The condition of factory equipment on some of the outlying estates is not so favorable, but much could be done in an improvised manner to handle limited production.

Regarding the early resumption of liquid latex shipment, the prospects would not seem to be very bright since latex handling equipment was particularly hard hit. Of the five ship-loading installations at ports in Sumatra and Malaya, only one is reported as being in comparatively good condition. However a certain amount of latex shipping could be done by loading ships' tanks direct from railway tank cars, a procedure we have followed once or twice in the old days at our Belawan plant. At the same time it must be remembered that the product handled in this manner would not be up to prewar quality standards since the usual bulking and settling at the port plant would be eliminated from the process. Shipment in drums constitutes another possibility during the period of rehabilitation.

The estate labor force, both in Sumatra and Malaya, is badly depleted and, at least at the beginning, this will probably constitute the factor which limits the rate of resuming production. Assuming the immediate availability of 40% of the normal labor force and in view of the fact that these men are in rather poor physical condition, I estimate that it will be impossible to secure more than about 30% of the total potential production until further recruiting is done. Under normal conditions labor is required on rubber estates at the rate of about 235 men per 1,000 acres in bearing.

The European and American plantation staff is somewhat depleted, but this condition should not constitute a limiting factor in the rate at which production can be resumed.

Political Situation

Disturbances arising out of the nationalist movement in the Netherlands India are so far preventing the return of the estate staff to the plantations in Sumatra and Java. There still is no apparent improvement in this situation, and conditions remain unsettled and confused. Even today all Europeans on the east coast of Sumatra, including the staffs of the rubber plantations, remain behind barbed wire in Medan. It is impossible to predict when the situation will settle sufficiently to allow private enterprise to enter the Indies.

In Malaya there appears little chance of the development of the same type of trouble as in Netherlands India since the occupation by British troops is already well advanced. However there is here a noisy Communist element which is demanding exorbitant rates for day labor. It is not impossible that this movement will result in troubled conditions in various parts of British Malaya. Also, in the case of Malaya, there are continued reports of rather serious looting, mostly by bands of Chinese bandits, and apparently very little is being done to curb or punish these acts of lawlessness.

Rehabilitation Plans

For both Malaya and Netherlands India, plans provide for the operation of the rubber estates by quasi-government organizations during the period of rehabilitation. The organization for Malaya, known as the M.R.E.O.C., is already in operation; because of the nationalist troubles the corresponding organization for Netherlands India is not yet able to function in Sumatra and Java.

Shortly after the cessation of hostilities the British Military Administration (Malaya) started the resumption of upkeep on the rubber estates in Malaya. Subsequently, after conducting a preliminary survey, the M.R.E.O.C. commenced to operate and has already started limited production on a number of estates throughout the peninsula. This production, under the auspices of the M.R.E.O.C., will be increased as time goes on, depending upon the availability of labor and equipment. To illustrate the progress being made, I might mention that we have recently been advised that tapping will be extended during March to include 50% of the acreage on two of our plantations in Kedah and 30% of the acreage on a third estate. I am unable to say whether these proportions are typical for the whole of Malaya, but am inclined to think they are higher than average for the peninsula. As indicated previously, this early production is entirely under the auspices of the M.R.E.O.C. and cannot be regarded as private operation.

New Blowing Agent for Sponge Rubber

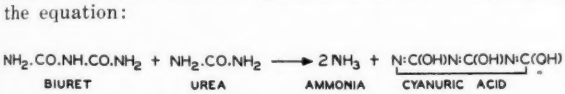
H. F. Schwarz[1]

THE rapid conversion of the rubber industry to synthetics has intensified the search for new blowing agents which can be used to make cellular or porous products usually called "sponge rubber," but as L. P. Gould suggests,[2] better referred to as "cellular rubber."

This article describes the use of Blowing Agent #15, one material which has been offered to aid the rubber industry in preparing unicellar products, i.e., those products containing a closed cell structure.

Composition

Blowing Agent #15 is a finely ground mixture of biuret and urea in the proportion which has been found most satisfactory for use in producing cellular products. On the application of heat to Blowing Agent #15, the biuret and urea unite to produce ammonia according to the equation:



At the temperatures used in the sponge rubber industry the ammonia is given off in sufficient quantity to develop an internal pressure greatly in excess of the external pressure. The result is expansion of the rubber stock by several hundred per cent. to produce a multitude of small cells, of which the majority are closed cells, i.e., small pockets of ammonia entirely enclosed in the rubber.

The cyanuric acid which is also produced is in no way harmful to the rubber compound. It does not affect the cure. It is insoluble in water and ordinary solvents; therefore it will not be affected by water or solvent in which the finished product may be immersed. Cyanuric acid is stable to temperature above 360° C. (680° F.).

It should be noted that both biuret and urea, when used separately, decompose to give off ammonia. The reason for using a mixture of the two is that the temperature at which decomposition takes place is lower for the mixture than for either material alone. Furthermore, to produce a given quantity of ammonia a smaller weight of a mixture of biuret and urea is necessary than of either material alone.

Patent applications have been filed covering the use of biuret and combinations of biuret and urea as blowing agents in rubber and synthetic rubber products.

Blowing Agent #15 has the following physical properties:

Specific gravity:	A white powder
Appearance:	1.447
Storage stability:	Excellent
Health Hazards:	None when used in natural or synthetic rubber in amounts recommended.
Blooming:	None in quantities of 12 parts per 100 or less.

General Compounding Principles

The compounding of natural rubber cellular products presents little difficulty compared with the problems encountered in making similar products from GR-S or other synthetics. Natural rubber is relatively easy to plasticize sufficiently so that any one of several gas producing agents has the ability to expand the rubber and hold it expanded until the cure is completed. Since even highly plasticized natural rubber has fairly good tensile strength and tear resistance, reenforcing fillers need not be used.

Most synthetics, on the other hand, are difficult to plasticize, and reenforcing fillers must be used to obtain sufficient tensile strength for most purposes. Since reenforcing fillers generally cause a decrease in plasticity, it is necessary to balance the three factors of plasticity, reenforcement, and blowing power to produce cellular products.

With a relatively weak blowing agent, such as sodium bicarbonate, it is possible to obtain a well-blown product with little strength by using a highly plasticized but poorly reenforced stock, or a poorly blown, but high strength sponge by using a reenforced stock which is not sufficiently plastic. Efforts to balance the two extremes often lead to products unsatisfactory in all respects.

The obvious remedy is to use a gas-producing agent with sufficient blowing power so that moderately reenforcing fillers can be incorporated into partially plasticized stock. Blowing Agent #15 is offered to fulfill these requirements: namely, to produce cellular products with good resilience and strength by using reenforcing pigments.

When Blowing Agent #15 is incorporated into a soft uncured rubber mix and heat is applied, the expansion of the rubber takes place in such a way that both closed cells and open cells are formed, although evidence indicates that in most rubber products the majority of the cells are of the closed-cell type. The production of sufficient quantity of closed cells which are permanently filled with gas makes it unnecessary to break the cells by compression as is done with sodium bicarbonate sponge. Consequently the extra operation of running the finished products through mangles or wringer rolls is not necessary when Blowing Agent #15 is used. When the cell walls are not broken, the finished article has better resilience or ability to come back to normal after compression.

In compounding stock for production of cellular products with Blowing Agent #15 it is not necessary to use auxiliary agents such as fatty acids, since Blowing Agent #15 decomposes directly into ammonia without any interaction with other materials. The only fatty acid necessary, that required for accelerator activation, is usually present in sufficient quantity in the crude synthetic rubber.

Blowing Agent #15 will generate sufficient ammonia to blow moderately plasticized stocks when the curing is carried out at temperatures of 287° F. and above. However experience indicates that more regular cell structure is obtained by using temperatures between 307 and 330° F.

Compounding with Specific Synthetics and Reclaim

In the following information on the use of Blowing Agent #15 in specific synthetics no attempt has been made to present perfect formulae which may be used in factory production. Instead certain formulae which have given satisfactory products in the laboratory are listed along with general information on the use of Blowing Agent #15, with the intention that these data will indicate the general approach to the best method of using it as a blowing agent.

Compounding GR-S Cellular Products

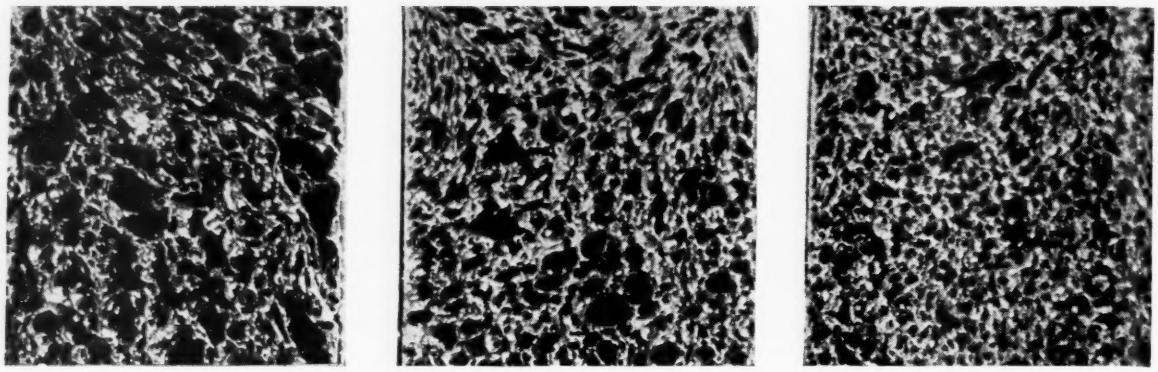
Table 1 gives formulae for GR-S products ranging from an apparent density of 0.15- to 0.22-ounce per cubic inch, or 220 to 320% in per cent. blow.

The GR-S must be well broken down, although not to the extent necessary when using sodium bicarbonate. R.P.A. No. 5 (two to four parts) has been found satisfactory instead of a prolonged milling period. In the examples given in this article the standard GR-S was used. It has been reported that GR-S-20-AC is more satisfactory for use in cellular products because it has a lower plasticity and it gives a less tacky uncured mix when large quantities of oil are incorporated.

Reenforcing fillers such as the various carbon blacks, which are necessary to give even moderate tensile strength to GR-S, can be used without producing too stiff an uncured stock, provided sufficient quantities of softeners are pres-

[1] Sherwin-Williams Co., Chicago, Ill.

[2] **Rubber Age (N.Y.)**, 54, 526 (1944). Throughout this paper the terms used in discussing cellular products are those suggested by Mr. Gould.



0.10 0.17 0.25

G-R- Sponge of Different Apparent Densities (Magnification, 4.5 Times)

ent. There is some indication that semi-reenforcing blacks such as SRF or HMF furnace blacks with oil-type softeners give the most satisfactory products.

TABLE 1. GR-S CELLULAR PRODUCTS

	A	B	C	D
GR-S (15 min. break)	100.	100.	100.	100.
MT thermal black	.....	10.	20.	20.
SRF furnace black	40.	5.	.....	.....
HMF furnace black	.....	.....	20.	.....
Whiting	.....	.....	.....	40.
Zinc oxide	3.	3.	3.	3.
Benzothiazyl disulfide	.....	.....	.....	1.
Tetramethyl thiuram monosulfide	.....	.....	.....	0.1
N-cyclohexyl 2-benzothiazole sulfenamide	1.5	1.5	1.5	.....
Process oil (Circo)	50.	35.	40.	.....
Dispersing Oil No. 10	.....	.....	.....	45.
Phenyl beta naphthylamine	1.	1.	1.	1.
Sulfur	2.5	2.5	2.5	2.5
Blowing Agent No. 15	8.5	5.	6.5	6.
PHYSICAL PROPERTIES				
Press cure at 324° F. (min.)	15	15	15	15
311° F. (min.)	20	20	20	20
% blow	320	250	220	220
Apparent density (oz./cu. in.)	0.15	0.17	0.20	0.22

There is no indication that the use of Blowing Agent #15 should cause any change in the standard practice of using delayed action acceleration in cellular rubber production. The accelerator combinations shown in the examples are among those that have been found satisfactory.

From 5.0 to 10.0 parts Blowing Agent #15 per 100 parts GR-S should be employed; the smaller quantities for the well-plasticized stocks, and amounts over 8.5 parts for only the stiffer stocks. Blowing Agent #15 will not bloom from cured or uncured stocks when less than 12 parts per 100 are used. Larger amounts may bloom as a fine white powder.

When special properties are desired, it is sometimes advisable to use more than one blowing agent in a formula. In this way the advantages of each blowing agent can be obtained in the finished product.

Table 2 illustrates the use of Blowing Agent #15 with diazoaminobenzene and with sodium bicarbonate in GR-S. Diazoaminobenzene is useful in producing cellular products with a very fine cell size, but cannot be used in many applications owing to its tendency to stain fabric or metal panels which come in contact with the rubber. By use of a standard amount of Blowing Agent #15 and a small amount of diazoaminobenzene, as in formula F, it is possible to obtain a product with fine cell structure, but a reduced tendency to stain.

Buna N Cellular Products

It is more difficult to produce cellular products from Buna N than from GR-S because of the less plastic quality of the raw polymer and the greater difficulty of plasticizing on the mill. By proper compounding, however, Buna N products can be made fully as satisfactory as those from GR-S.

TABLE 2. COMBINATION OF BLOWING AGENTS

	E	F	G
GR-S (15 min. break)	100.	100.	100.
MT thermal black	20.	20.	20.
HMF furnace black	20.	20.	20.
Zinc oxide	3.	3.	3.
Benzothiazyl disulfide	.....	.....	1.0
Tetramethyl thiuram monosulfide	.....	.....	0.1
N-cyclohexyl 2-benzothiazole sulfenamide	1.5	1.5	.....
Process oil (Circo)	40.	40.	40.
Phenyl beta naphthylamine	1.	1.	1.
Stearic acid	.....	.....	15.
Blowing Agent No. 15	6.5	6.	3.
Diazaminobenzene	.....	0.2	.....
Sodium bicarbonate	.....	.....	15.
PHYSICAL PROPERTIES			
Press cure at 324° F. (min.)	15	15	15
% blow	220	220	180
Apparent density	0.20	0.20	0.23
Cell size	Medium	Fine	Medium

TABLE 3. BUNA N CELLULAR PRODUCTS

	H	I	J
Chemigum N-1 (15 min. break)	100.	.....	.....
Butaprene NM (15 min. break)	.....	100.	.....
Hycar OR-15 (15 min. break)	.....	.....	100.
SRF furnace black	30.	.....	.....
FT thermal black	.....	40.	.....
MT thermal black	.....	.....	60.
Zinc oxide	3.	3.	3.
Stearic acid	0.5	0.5	0.5
Phenyl beta naphthylamine	1.	1.	1.
N-cyclohexyl 2-benzothiazole sulfenamide	1.3	1.2	.....
Benzothiazyl disulfide	.....	.....	1.5
Tetramethyl thiuram disulfide	.....	.....	0.1
Dibutyl phthalate	80.	75.	80.
Sulfur	2.	2.2	2.
Blowing Agent No. 15	10.	10.	12.
PHYSICAL PROPERTIES			
Press cure at 311° F. (min.)	30	30	30
% blow	240	230	210
Apparent density (oz./cu. in.)	0.19	0.20	0.22

To compensate for the nerve of Buna N it is suggested that those grades of Buna N easiest to break down on the mill be used. In addition it is necessary to incorporate rather large quantities of plasticizers.

Table 3 shows formulae that have given satisfactory products in the laboratory.

Cellular GR-S Ebonite

When Blowing Agent #15 is incorporated into an ebonite (hard rubber) stock, a very interesting type of cellular product is obtained. Since Blowing Agent #15 produces a majority of closed cells when gas is evolved, the result is a light weight, but strong product which will float on water indefinitely since there is no way that the water can penetrate through the bulk of the material.

Production of cellular ebonite from GR-S presents a greater problem than encountered with soft GR-S because the stock must be held inflated for a longer period of time before cure is completed. Formula K, Table 4, has given fairly good results in the laboratory, but a better product

(Continued on page 219)

Study of the "H" Test for Evaluating the Adhesive Properties of Tire Cord in Natural and GR-S Rubbers [1]

THE adhesion of cotton tire cord to natural rubber apparently never presented any special problem to the tire industry supposedly because of the strong mechanical bond formed by the numerous loose or projecting cotton fiber ends which become embedded in the soft rubber during vulcanization. These fiber ends are not present in tire cords made from synthetic, continuous filaments, with consequent poor adhesion of such filaments to rubber. With the production of GR-S, its adhesion to cotton tire cords was found to be inferior to that obtained with natural rubber, especially at higher temperatures. Often separation would occur between cord fabric and rubber immediately after the tires came from the vulcanizing molds and before they had cooled. It was obvious that special attention would have to be given to this problem.

The first step in the study of adhesion seemed to be the selection or even development of a suitable test method for this property. The only published method that could be found, that given in A.S.T.M. Designation D413-39, involves the use of sections of finished tires, or fabric cured in rubber slabs, and is obviously both inconvenient and expensive. There were also other methods in use by certain of the tire manufacturers, such as the compressed-cylinder method used by The B. F. Goodrich Co., and the so-called "H" adhesion test originated by the Goodyear Tire & Rubber Co. The latter method was selected for use in this study because of its more general use in a number of laboratories and its previous application to cotton tire cord.

Essentially the "H" test is a measurement of the force required to pull a single cord, in the direction of its axis, from a strip of rubber in which one end of the cord over a given length is embedded. Thus the quantity measured is a shearing force acting across the cord-to-rubber surface. The opposite end of the piece of cord is held in the pulling clamp by lateral pressure from the jaws, transmitted through a second rubber strip. The two end-strips with the interconnecting cord form a specimen resembling the letter "H," from which the test derives its name. The H-shaped specimens are obtained by cutting them from a cast, molded for this purpose, and consisting of a number of rubber strips interconnected at intervals by cords which extend through all the strips. The diagram of a typical mold in Figure 1 suggests the general form of the cast.

A visit paid to various commercial laboratories employing this test revealed that the technique was by no means standardized as forming molds of widely different sizes and thicknesses were being used. In addition other particulars such as type of rubber stock, curing cycles, test clamps, and other factors differed. Results from different laboratories could therefore not be compared, and selection of test conditions was necessary. This paper presents an experimental basis for the selections made, together with an outline of the proposed procedure.

Equipment and Materials

Molds, Press, and Testing Equipment

Two different molds were available for experimental use. Most of the test specimens were made on a mold constructed from specifications furnished by the Armstrong Tire & Rubber Co., which will hereinafter be referred to as the Armstrong mold. The number and arrangement of the cord slots and rubber channels are shown in Figure 1. The plate is 5½ by 10 by ⅝ inches. The rubber strip channels are ⅜-inch wide by 0.100-inch deep and are separated from one another by ¼-inch. The ten cord slots are 0.040-inch wide by 0.100-inch deep and displaced from each other by one inch on centers.

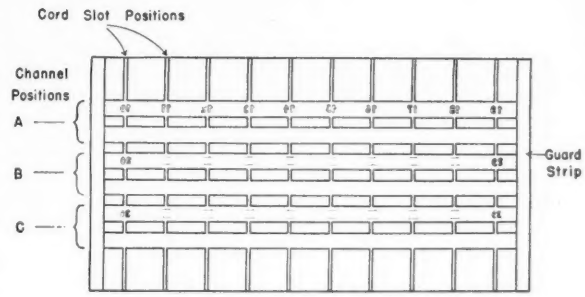


Fig. 1 Armstrong Mold for "H" Adhesion Test

A second mold was constructed from specifications furnished by the Mansfield Tire & Rubber Co. and will hereinafter be referred to as the Mansfield mold. This mold was 12 by 14 by 3¼-inch. The pattern of rubber channels and cord slots in this mold is essentially the same as in the Armstrong mold, except that the channels are 0.125-inch deep and only eight inches long.

A hydraulic press having steam-heated plates was used for curing in most of the experiments. Unless otherwise specified, the cure was for 30 minutes at 287° F. in a previously heated mold, under a pressure of 550 p.s.i. on the mold face. The casting was then removed and allowed to stand for a period of time, usually 24 hours or more. The casting was then cut so as to give one test specimen for each cord position and set of channel positions shown in Figure 1.

The adhesion of cord to rubber was measured in most cases with a Scott tester; the capacity was set at 50 pounds. In a few cases, a Suter tire-cord tester with autographic recorder was used; the capacity was set at 25 pounds. The jaw speed was four inches a minute in a number of the earlier tests and then 12 inches a minute, unless otherwise noted. Special clamps were constructed patterned after those in use by the Mansfield and Armstrong laboratories.

Since the study was also to determine how cord-to-rubber adhesion varies with temperature, usually half the specimens from each casting were tested at elevated temperature; 275° F. was used unless otherwise noted.

Rubber Stocks

Five different tire carcass stocks were used in the study. The sample numbers, types of rubber, dates of receipt, and molds for which intended were as follows:

Sample No.	Type of Rubber	Date of Receipt	Mold
Co-767	Natural	Sept. 10, 1943	Armstrong
Co-768	GR-S, S-4	Sept. 13, 1943	Mansfield
Co-783	GR-S, S-4	Sept. 21, 1943	Armstrong
Co-1063	GR-S, S-4	Nov. 20, 1943	Armstrong
Co-1352	GR-S, S-4	Feb. 29, 1944	Armstrong

[1] Abstracted from United States Department of Agriculture, Bureau of Agricultural and Industrial Chemistry, Publication AIC-99, by W. James Lyons, Mary L. Nelson, and Carl M. Conrad, Southern Regional Research Laboratory, New Orleans, La. October, 1945.

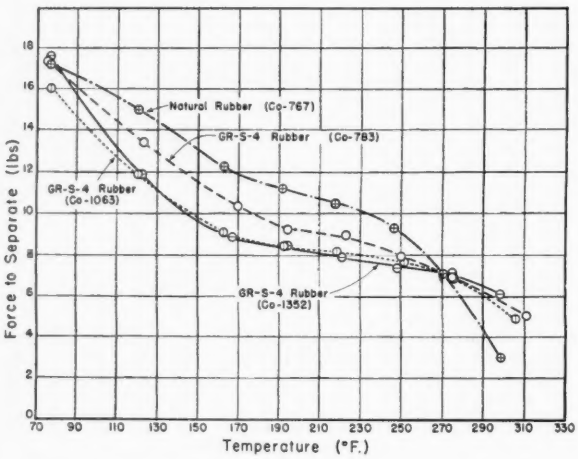


Fig. 2. Adhesion of Various Rubber Stocks to Cotton Tire Cord at Different Temperatures

The Armstrong mold stocks were sheeted, rolled on to frictioned, square-woven backing cloth to give a gage of about 0.055-inch, and then covered with Holland cloth. The Mansfield stock was sheeted to a gage of approximately 0.070-inch and then rolled on to a plain unfrictioned duck to give an over-all gage of 0.105-inch. The other surface was covered with Holland cloth.

Tire Cords

For most of the tests two different tire cords, both manufactured from the same Stoneville 2B cotton, were used. One cord, designated Co-752, was of 24/4/3 construction, had a cable twist of 10.5 turns per inch, a gage of about 0.0285-inch, and was referred to as "low gage." The other cord, designated Co-753, was of 23/5/3 construction, had a cable twist of 8.7 turns per inch, a gage of about 0.0315-inch, and was referred to as "medium gage."

Influence of Experimental Conditions on Observations

Predrying of the Cord

Two series of tests were made from which it was concluded that the drying of untreated cotton tire cord before use in the adhesion test could be safely dispensed with under ordinary circumstances. In the case of treated tire cord, the influence of moisture on the adhesive itself would naturally dictate the procedure to be followed.

Pressure on Mold during Cure

Two experiments were conducted to determine the influence of mold pressure. These tests were made with different rubber stocks and tire cords. The results obtained indicated that pressure during cure has no significant influence on the results of cold measurements, but suggested that it does influence the results when the adhesion is measured hot. This latter difference is associated with low pressures only and is not appreciable in the 290-542 p.s.i. pressure range. In routine work it would seem advisable to use a curing pressure similar to that used in tire manufacture, i. e., 250 p.s.i.

Testing Temperature

To obtain information on the behavior of cord-to-rubber adhesion as a function of temperature, a series of tests employing four different rubber stocks, medium-gage cord Co-753, and covering a temperature range from 77-300° F., was undertaken. The results are shown graphically in Figure 2. Adhesion of the cord at room temperature (77° F.) and again at about 275° F. is the same for all four stocks. Between these points natural rubber exhibits the best adhesion, but its adhesion falls off more rapidly above 275° F. than that of the synthetic stocks. The temperature of 275° F. appears the highest to which adhesion specimens can be exposed without severe damage to adhesive properties and is recommended as a routine temperature for use in high-temperature adhesion tests. Additional tests revealed poor correlation between adhesion test results at room and high temperatures, showing the need of "hot" adhesion measurements as a routine part of the testing procedure.

Speed of Pulling Clamp

Tests were made which clearly showed adhesion values increase progressively with increasing clamp speed both at room and elevated temperatures. A speed of 12 inches per minute is recommended for the moving clamp for the following reasons: to increase magnitude of reading and decrease effect of frictional losses; to conform with conventional clamp speeds; and to secure the highest possible rate of loading of the cord itself.

Position of Test Piece in the Curing Mold

Investigation showed a significant difference in adhesion associated with channel positions in the mold, but none associated with cord positions. Analysis of test procedure and results, however, gave the conclusion that any source of influence of channel positions on adhesion must have been exterior to the mold. Nevertheless in tests recorded here it was the practice, in any one test, to lay the series of test cords in the cord slots in a progressive succession in such a way that each cord sample occupied as many different cord slots in the different cures as possible.

Character of Jaw Surfaces and Pressure on Clamps

Tests were conducted to check the belief that adhesion measurements in the "H" test were quite sensitive to the conditions under which specimens were attached to clamp jaws in the tester. From results obtained it appears that any corrugations put into the rubber support strip of the test specimen by the serrated jaw surfaces are not communicated across the jaw slit to the embedded cord and therefore do not affect adhesion measurements. Additional experiments also showed that differences in clamping pressure of the jaws are not reflected in adhesion measurements.

Calendering-Direction in Rubber Channel Strips

Experiments were made to determine effect of mechanical anisotropy of rubber from calendering operations, and possible effect of directions of warp and filler of the backing cloth with respect to specimen direction. Data obtained indicated definitely that the orientation brought about in the test specimen by calendering has no influence on adhesion values. This is also the case for differences in direction of backing cloth yarns and test specimens.

Differences in Molds

Tests were made with different stocks in both the Mansfield and Armstrong molds, using a 250 p.s.i. curing pressure on the mold face in all cases. Analyses of results indicated that the use of different molds, stocks, and cures gave highly significant differences in adhesion values.

Presence of Central Rubber Sheath around Cord

It was thought that the rubber sheath which forms around the cord between the two rubber strips during molding might affect adhesion measurements. Experiments conducted to determine this effect indicated that the sheath causes increases in adhesion values at both room and high temperatures. The increases were about the same at both temperatures and, in some cases, exceeded 25% of the total. Since the sheath affects the absolute magnitude of the adhesion force, corrections for this effect are not necessary in evaluating testing techniques, rubber stocks, etc., where the effect may be considered to be the same in all samples tested. The method for treating this correction is described in a later section on characteristic adhesion.

Influence of Time as a Factor in the Test

Period of Time Elapsing between Curing and Testing

Tests were made to determine whether the 24-hour aging period customarily used was significant. Results

showed that adhesion does increase for a time after cure at least when measured at room temperature, but that it comes to a stable value during the first 24 hours, after which there is no appreciable change. On the other hand these experiments indicate that no upper limit need be placed on the period between cure and testing. While tests at 275° F. failed to show any effects of delayed testing on adhesion, the use of a 24-hour waiting period appears desirable for uniformity.

Length of Heating Period for Specimens at 275° F.

The adhesive forces of specimens tested immediately upon removal from the oven show a slight drop between one- and 1½-hour heating periods, indicating that the specimens do not quite reach the prevailing oven temperature after only one hour of heating. Variations in adhesion for specimens heated for 1½ hours or longer are not significant, justifying the decision that 1½ hours is the optimum heating period for the test at 275° F.

Delay in Testing Hot Specimens

The time delay in testing hot specimens could conceivably affect adhesion measurements in high-temperature tests. Experiments to check this factor indicate that a delay in testing up to about one minute introduces no significant difference (error) in high-temperature adhesion tests. For longer delay periods the observed adhesion forces rise. After 90 minutes the specimens regain about 85% of the loss in adhesion due to high temperature.

Rubber-Stock Factors Influencing Adhesion

Differences between Rubber Stocks

Differences in adhesive behavior between the natural and GR-S rubber samples, and between the three GR-S samples themselves, are shown in Figure 2. It is to be expected that the adhesion of tire cord will be different for the various types of rubbers, for rubber of the same type but from different sources, and for batches compounded at different times.

Time and Temperature of Storage of GR-S Stock

Tests reveal that stocks stored at 45° F., in a refrigerator, show neither a gain nor an appreciable loss in adhesion whether measured at room or at elevated temperatures. Although the adhesion measured at room temperature declines steadily if the stock is stored for long periods at room temperature before curing, the adhesive force measured at 275° F. appears not to be affected. It is therefore evident that storage of uncured stock at a low temperature is necessary to obtain reproductive results.

Uniformity of Adhesion within a Single Roll of GR-S Stock

By means of test it was determined that samples of a stock, Co-1352 in this case, were substantially uniform throughout the length of the roll, insofar as its adhesive properties were concerned.

Cord Factors Influencing Adhesion

Gage of Cord

Account must be taken of the gage in assessing the merits of different factors that influence adhesion, when cords of different gage are employed. Results of experiments conducted show that increase of gage results in a progressive increase in adhesive force. Observed data are in reasonable agreement with values computed from the equation $A = k\pi GL$, where A is the measured force of adhesion, G is the measured gage of the cord (here used as diameter), L is the contact length, and k, the proportionality factor, is the adhesive force per unit area. The data obtained in tests of gage effect on adhesion are plotted in Figure 3. It is evident that whenever the adhesion of cords of different gage is to be compared, adjustment must be made for the difference in gage. The method for making this adjustment is discussed in a later section on characteristic adhesion.

Number of Plies and Cord Twist

Tests were made on two and three-ply cords having the same number of turns per inch, and on cords of the same ply having a range of twist. In general the two-ply cord and 3-ply cord show no significant difference in adhesion, but a slight increase in adhesion is noted with increasing twist.

Adjustment for Cord Twist

A relation by means of which the adhesion of a cord having a given twist could be calculated from observations on a similar cord having some other twist would be useful in many cases. While the evidence to which reference has been made in the foregoing section favors cord angle rather than the turns per inch for adjustment of different constructions, the former is less convenient in practice. Since the effect is quite small, adjustments may be made in characteristic adhesion with sufficient accuracy by means of the following derived equation involving the turns per inch:

$$K_2 = K_1 + 13.7\ (T_2 - T_1)$$

where K_1 and K_2 are the available and desired characteristic adhesion, respectively, and T_1 and T_2 are the corresponding turns per inch in the cord. For the characteristic adhesion measured at 275° F., substitute 5.6 for the value of 13.7 in the above equation. From these equations the average increase in adhesion is only 13.7 p.s.i. per turn per inch at room temperature, and 5.6 p.s.i. per turn per inch at 275° F.

The Characteristic Adhesion

Definition

In the section on gage of cord it was pointed out that adhesion varies with the gage of the cord being tested and can be traced to variation of the area of adhesive surface with gage. When the measured adhesion is expressed as a ratio of the cord surface involved, the significant effect of gage disappears. By transposing the terms of the equation given in that section, we get

$$\frac{A}{G} = k\pi L$$

where the left-hand term characterizes the adhesion, in shear, of a particular cord, independently of the gage. Since evidently the ratio A/G is proportional to L, we may refer the ratio to unit length of contact (one inch) by dividing by L:

$$\frac{A}{GL} = k\pi = K$$

Insofar as the observed value, A, gives the force actually required only to shear the cord-rubber bond of one cord along the length L, the quantity $k\pi = K$ measures the adhesion of a particular cord-rubber combination independently of gage and length of contact. It may be interpreted physically, in the ideal case, as the force required to shear a one-inch width of tightly packed cord fabric from a one-

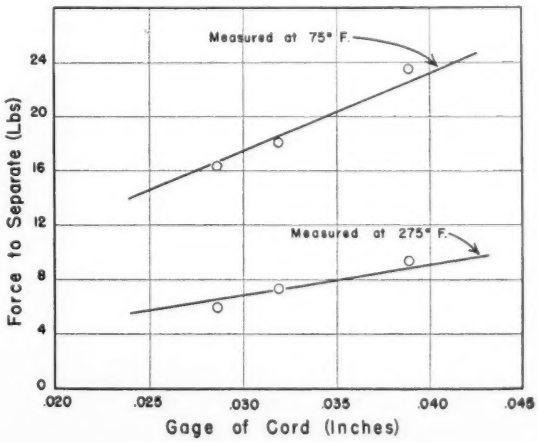


Fig. 3. Effect of Gage on Rubber-Cord Adhesion

inch square of rubber. Since the length of contact of cord to rubber, after removal of the rubber sheath around the cord between the end-strips, is always 3/8-inch in the present "H" test, we have

$$K = \frac{8\ A}{3\ G}$$

where A and G are the measured adhesion in pounds, and cord length in inches, respectively. K may be called the "characteristic adhesion."

Estimation of Characteristic Adhesion from Tests on Specimens with Sheath Present

In some cases the procedure followed may not involve removal of the sheath. Data are presented in Figures 4 and 5 from tests attempting to correlate characteristic adhesion with crude characteristic adhesion (computed for the specimens with sheath present). Reference to these figures shows that a definite correlation does exist. The regression equations computed by the method of least squares, assuming a linear relation, for characteristic adhesion are:

At 75° F.: $K = 0.8960\ K_u + 5395\ G - 299$
At 275° F.: $K = 0.5518\ K_u + 3305\ G + 65$

where K_u is the crude characteristic adhesion, and the gage, G, is expressed in inches. Further analysis of the data showed that the correlation coefficient associated with the equation at 75° F. was 0.934 and the standard error of estimate 70.3 p.s.i. For the equation at 275° F. the respective figures were 0.760 and 58.6 p.s.i. Regression lines corresponding to the gages 0.024-inch and 0.032-inch are drawn in Figures 4 and 5.

Proposed Procedure for Conducting the "H" Adhesion Test

Rubber Stock and Preparation of Molded Test Specimens

The rubber skim stock, both natural and synthetic, cut into sections of 10 by 12 inches, is stored at low temperature, preferably in a refrigerator. Before use each new supply is to be gaged with a dial micrometer to make certain that cut pieces will completely fill the mold channels and allow for some overflow during cure. The Holland cloth is not included in this gage. Skim stock with backing fabric for use in the Armstrong mold should have a gage of about 0.055-inch, but not below 0.050-inch. The skim stock with backing fabric for use in the Mansfield mold should have a gage of about 0.095-inch, including canvas. The mold with cover, previous to curing, is placed between the hot plates of the hydraulic press and allowed to heat up with the plates as steam passes through the latter.

With a cutting tool in which the blades are spaced to match the mold channel width, strips of skim stock are cut 10 inches long for the Armstrong mold, or eight inches long for the Mansfield mold, with the length of the strips parallel to the warp of the fabric. Prior to the molding operation, the gages of the cord samples being tested are to be obtained. Cords are to be in a normal condition of humidity, and specimens should be about 10 inches long for the Armstrong mold, and 16 to 18 inches long for the Mansfield mold. Before being cut to length, the cord should be knotted about ½-inch from the end of each specimen to avoid loss of twist during handling. In addition to test cords, the use of an identical cord as a control is advantageous.

When the press and mold have been at the required temperature of 287° F. for about 15 minutes, the mold is removed to a table. The rubber strips are pulled one by one from the Holland cloth and quickly fitted, with fabric side down, into the six channels in the mold. The cord specimens, properly identified, are now laid in the transverse cord slots in the mold so as to cross the skim coat of the rubber strips. Each cord is held in place by the end knot resting against the back edge of the mold, and a four-ounce weight is clipped to the other end of the cord hanging down over the edge of the mold to provide uniform tension.

When all the cords are in place, the remaining six strips of rubber are pulled from the Holland cloth, laid in the channels, with the skim coat down, directly over the strips

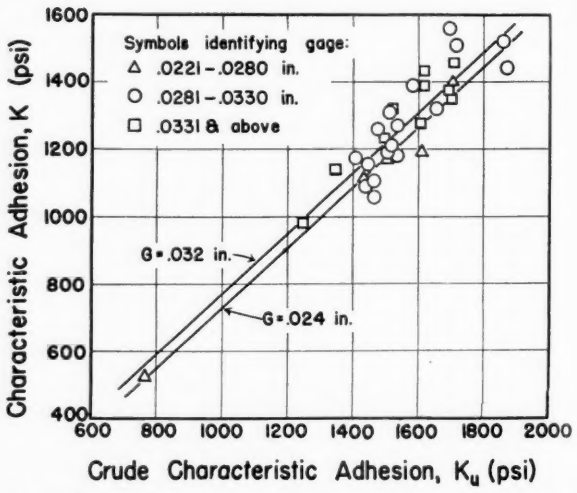


Fig. 4. Characteristic Adhesion as a Function of the Crude Characteristic Adhesion (Sheath Present), Determined at 75° F.

already in the mold, and pressed into place to avoid overlying the channel edges at any point. The cover is replaced on the mold; the weights are removed from the cords; the protruding ends of cords are clipped off near the edge of the mold, and the assembly is placed into the press, all as quickly as possible. The rubber is cured for 30 minutes at 287° F. (or at the proper temperature for the stock) under a load computed to give a pressure of 250 p.s.i. on the mold surface. When curing is complete, the rubber casting is set aside for at least 24 hours before testing.

Separation of Specimens and Measurement of Adhesion

The specimens cut from the casting are divided into two parts: one for adhesion tests at room temperature, and the other for tests at elevated temperatures. Before testing, the rubber sheath around the cord and the flash between rubber end-strips are removed without disturbing the rubber about the cord entering the strip.

All adhesion tests are to be made on a vertical pendulum-type rubber or textile testing machine, with the speed of the moving clamp to be fixed at 12 inches per minute. The upper clamp is to have a continuous clamping surface across the whole width of each jaw. The lower clamp fits on a stud on an adapter through which the breaking force is applied. This clamp has a vertical slot about 3/16-inch wide in the middle of both jaws. For tests at elevated temperatures, specimens are mounted in individual lower clamps, and the assemblies heated to the proper temperature and

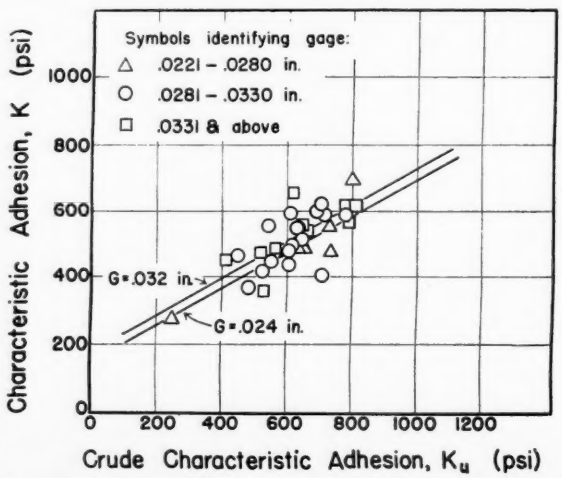


Fig. 5. Characteristic Adhesion as a Function of the Crude Characteristic Adhesion (Sheath Present), Determined at 275° F.

TABLE 1. APPLICATION OF "H" ADHESION METHOD TO VARIOUS TIRE CORDS

Sample No.	Tire Cord and Treatment	Cord Gage Ins.	Characteristic Adhesion* At 75° F. Absolute p. s. i.	At 75° F. Relative† %	At 275° F. Absolute p. s. i.	At 275° F. Relative† %
Co-973	Rayon cord, untreated, 1100/2	0.0240	275	100	188	100
Co-1157	Rayon cord, treated commercial adhesive	.0255	969	352	435	231
Co-971	Nylon cord 210/4/2	.0160	307	...	212	...
Co-893	Rayon cord, untreated	.0224	235	...	162	...
Co-968	Cotton cord, Standard 16/4/3	.0342	1119	...	471	...
Co-753	Cotton cord, GR-S Stock Co-783	.0315	1175	100	499	100
Co-753	Cotton cord, initial test of new GR-S Stock Co-1063	.0315	1077	92	496	99
Co-753	Untreated	.0315	1175	100	499	100
Co-1233	Co-753 extracted ethyl acetate	.0325	1226	104	498	100
Co-1234	Co-753 extracted acetone	.0314	1211	103	509	102
Co-996	Co-753 extracted benzene	.0330	1176	100	515	103
Co-1444	Co-753 extracted xylene	.0288	1130	96	433	87
Co-1061	Co-753 with commercial adhesive	.0364	‡	‡	633	127
Co-1232	Co-753 with polyvinyl acetate	.0337	710	60	354	71

*Adjusted to mean of basic control cord.
†Based on untreated cord.
‡Cord broke before separation occurred.

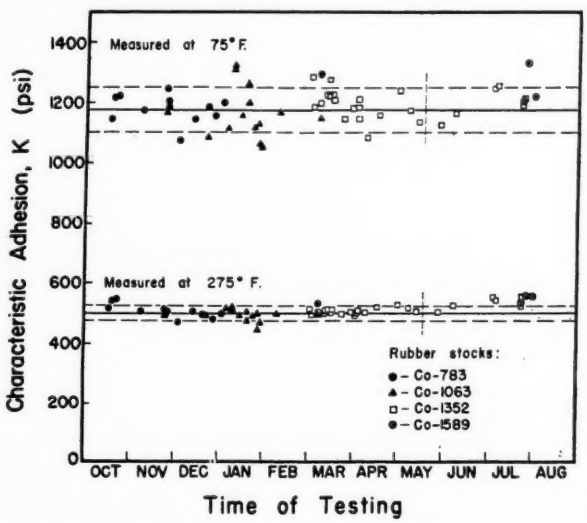


Fig. 6. Control Chart for Judging the Homogeneity of Characteristic-Adhesion Means Obtained on the Basic Control Cord. The Central Lines and Control Limits Were Computed from the Data of 41 Tests Made during the First Eight Months, Indicated by the Vertical Dashed Lines

kept in the oven until ready to test.

Adjustment of Results to a Basic Control

The use of a basic control cord sample is especially valuable in disclosing variation introduced into the results by a new technician, or the use of a different testing machine, or any other of a number of sources of error. After a number of separate tests have been run, each containing the basic control cord, an average value is calculated for the characteristic adhesion, K, of the control cord. In comparing results from different tests, then, the K's for all the samples in a given test are first adjusted by the ratio of the K of the control cord in that test to the mean of the K's for all tests, as

$$\text{Adjusted K} = \text{Original K} \times \frac{\text{Average K for Basic Control}}{\text{K for Basic Control of Given Test}}$$

A control chart may be kept of the characteristic adhesion over the period of test. Such a chart appears in Figure 6, where the different symbols represent the rubber stocks used. The solid line represents the grand average characteristic adhesion of the control cord, obtained in 41 tests during the first eight months shown. The dashed lines represent the control limits, calculated from the standard errors of the individual test means according to the procedure recommended by A.S.T.M. Committee E-1 on Methods of Testing in its manual on presentation of data. The limits can, of course, be chosen to meet the particular situation. Then, an increase in variance of data due to change in stock or other condition affecting the basic control is made evident by the new values falling outside the control limits more than the expected proportionate number of times. It may be noted from the chart that values for the last two months, July and August, do not follow the same trend as earlier values, owing to the use of a new testing machine whose calibration evidently does not agree with that of the old machine.

Examples of Application of the Method

The application of the "H" adhesion test under the proposed conditions to a series of typical cotton and rayon tire cords is shown in Table 1. It will be seen that rayon cord without treatment has a very low characteristic adhesion, as compared with cotton cord, but that the adhesion at both normal and high temperatures is nearly up to cotton after treatment with a commercial adhesive. The characteristic adhesion of nylon is seen to be somewhat better than that of rayon, but still far below that of cotton.

Precision of the Method

As a basic control cord was included in all tests, the results obtained permit calculation of the standard error. The observed standard error in characteristic adhesion at 75° F. based on 41 different tests is 4.9%, and computed error from within-test variation is 2.6%. The respective errors at 275° F. are 5.9% and 3.2%. This analysis therefore shows the presence of further still unidentified and uncontrolled variables.

Summary

The "H" adhesion test has been adopted tentatively for evaluating the adhesive properties of cotton and other tire cords in natural and GR-S rubber. The various factors which could have been expected to influence the adhesion or its measurement fall into four broad classes: experimental conditions, time factors, rubber-stock factors, and cord fabrics.

Predrying of cotton cord and variations in the pressure on the mold were found to have no significant effect on adhesion. Temperature of test was found to be highly important. Among factors involved during molding of specimens, direction of calendering of the rubber stock and differences in types of molds used were found to have, in general, little or no influence. The position of the specimen in the mold is likewise not of importance. The rubber sheath around the cord between the end strips of each specimen was found to cause significant, but spurious increases in adhesion. As regards the testing machine, the conditions of clamping of the specimen were found to be without effect, but the speed of the pulling clamp gave significant variations in adhesion.

A 24-hour aging period was found necessary for testing at room temperature, and a 1½-hour heating period needed before testing of specimens at high temperatures. A one-minute delay in testing of high temperature specimens was

(*Continued on page 219*)

Use of Durez 12687 Powdered Resin with Synthetic Rubbers

J. W. Ferguson[1]

ONE of the problems facing the compounder of hard and semi-hard synthetic rubber stocks is the difficulty of adding sufficient loading on the mill, a result of the comparative stiffness or retention of "nerve" which is characteristic of these compounds. In general this problem is overcome by the addition of various plasticizers, but with a sacrifice of such qualities as hardness and tensile strength.

In January, 1945, a new thermosetting resin, Durez 12687, was introduced as a solution to this problem. It was claimed that the addition of various percentages of the resin to certain synthetic stocks would soften or plasticize them to a point where they could be easily handled on the mill without detracting from their final physical properties. Since that time a number of rubber goods manufacturing companies have experimented with the resin and subsequently used it in production. It is reported that the results have been most satisfactory in the majority of cases. Not only is the stock more easily handled on the mill, but a number of its physical properties are noticeably improved. The resin is most useful with the acrylonitrile-butadiene copolymers, generally referred to as Buna N, and has been found to possess limited advantages with the styrene-butadiene copolymers (GR-S) and with neoprene.

Properties of Durez 12687

Durez 12687 is a thermosetting phenol-formaldehyde resin furnished in finely powdered form to simplify handling and to insure easy dispersion on the mill. It has a melting point of 70 to 75° C., and at the pressures developed during milling, the resin disperses readily in rubber formulations on the mill. When the resin is cured alone, it is hard, inflexible, heat resistant, and insoluble in oils and organic solvents.

With the Buna N rubbers the 12687 resin has been found to have unlimited compatibility. There is also evidence of chemical reactivity between the resin and the coplymer. In addition to exerting very useful plasticizing action the resin acts as a reenforcing agent for Buna N. Compatibility with GR-S is less than with Buna N, but is still sufficient to make 12687 resin useful for many applications.

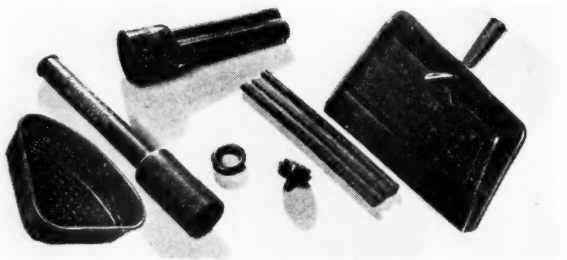
Compounding Details

In general the usual compounding procedures for the various synthetic rubbers are followed when processing formulations involving 12687 resin.

With simple mixtures of Buna N and 12687 resin, containing no sulfur or accelerators, the resin definitely serves as a vulcanizing agent, producing partially, but not tightly cured stocks. It may be possible in some cases, therefore, to reduce the amount of sulfur normally used, thus producing a stock with improved aging characteristics.

The compression set of Buna N is generally very low, but when this resin is used with it, the compression set increases as the percentage of resin increases in the formulation. Since softeners, which are sometimes used in formulations containing resins, also influence compression set, it has been found advisable to use organic esters for least increase in set, with styrene derivatives next and coal-tar derivatives being poorest in this respect.

With GR-S the 12687 resin does not show any appreciable reenforcing or vulcanizing action, but it is helpful as a processing aid and in building up hardness. Because of the plasticizing or softening effect and the contribution to hardness, the compounder is able to produce GR-S stocks with hardness values from 70 to 95 with processing characteristics of much softer stocks. The 12687 resin has also been found to improve hot tear resistance.



Some Examples of Items Molded from Hard and Semi-Hard Synthetic Rubbers in Combination with Durez Phenolic Resin 12687. The Electric Light Handles, Grommet, Extruded Strip, and Plug Are Products of Johnson Rubber Co., and the Dust Pan and Sink Strainer Were Made by Wooster Rubber Co.

Hard GR-S stocks, such as would be obtained by using 100 parts of GR-S, 100 parts of 12687 resin, and a heavy loading of fillers, show exceptional heat resistance—superior to the best heat resistant stocks produced from natural rubber. Such stocks, which are in the ebonite class, have better aging properties because of the reduced sulfur content made possible by the use of this resin. The cured hard rubber machines readily, and its oil and heat resistance is improved by virtue of the oil and heat resistance of the thoroughly cured resin. The hard rubber comes from the mold with a high gloss, and exposure tests indicate that this gloss is retained to a greater extent during weathering than with compounds not containing the Durez.

One formulation involving 40 parts of 12687 resin on 100 parts of GR-S and having a hardness of 98 has been mixed in a Banbury with no difficulty from scorching and was then extruded without showing the usual poor surface of GR-S extruded stocks. There was no evidence of surface roughness or dogskinning.

In the case of neoprene, it is possible to secure, by using 50 parts of 12687 resin, a tensile strength of approximately half that normally obtained with 30 parts of Gastex. The physical properties of such a compound are inferior to those obtained with carbon black, but the resin does aid in building up the ultimate hardness of neoprene stocks, usually one of the most difficult properties to obtain with this rubber.

Discussion of Experimental Results

The following test results,[2] as obtained by the Hycar Service Laboratory and the V. L. Smithers Laboratory, illustrate the effectiveness of 12687 resin as a reenforcement for Buna N and also emphasize the balance of high tensile strength, hardness, elongation, and low temperature flexibility secured in formulations containing this resin.

An examination of the above test results permits certain conclusions to be drawn concerning the use of 12687 resin with Buna N rubbers. A comparison of Compound A with Compounds B and C shows the effectiveness of 20 and 50 parts of this resin. By increasing the resin in 10 part increments, the tensile strength and hardness were found to increase proportionately.

The special advantages of 12687 resin, as compared with a standard phenolic resin such as Durez 175, becomes ap-

[1] Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y.
[2] See table next page.

Compounds and Test Data—Buna N and 12687 Resin

Compound	A	B	C	D	E	F
Hycar OR-25	100.0	100.0	100.0	100.0	100.0	100.0
Zinc oxide	5.0	5.0	5.0	5.0	5.0	5.0
Stearic acid	1.5	1.5	1.5	1.5	1.0	1.5
Sulfur	1.5	1.5	1.5	1.5	1.5	1.5
Altax	1.5	1.5	1.5	1.5	1.5	1.5
Durez 12687	....	50.0	20.0	20.0	75.0	....
Durez 175	....	....	....	....	....	75.0
Gastex	....	....	....	50.0	60.0	....

Original Physical Properties of Vulcanizates

Cure, min. at 310° F.	30	45	30	45	30	45	30	45	30	45	30	45
Tensile, p.s.i.	300	325	2400	2600	1240	1330	2750	2830	3925	3925	1025	825
Modulus, 300%	....	....	2400	....	1950	1110	2800	....	....	....	650	....
Elongation, %	390	430	300	280	330	340	260	270	40	40	570	290
Hardness, Shore	48	50	92	93	63	64	78	80	98	98	64	64
Specific gravity	1.03		1.08		1.08		1.17		1.21		1.08	

Properties after Aging in Air Oven 70 Hours at 212° F.

Tensile, p.s.i.	374	2600	1240	2740	....	1100
% change, tensile	+15	0	0	0	....	+33
Elongation, %	320	180	280	220	....	250
% change, elongation	—26	—36	—15	—15	....	—14
Hardness, Shore	49	96	70	82	....	70
180 degree bend	OK	OK	....	....	....	OK

Note: While all of the above work was done on Hycar OR-25, this information is applicable to equivalent grades of Buna N made by other producers. In general it has also been noted that the higher the acrylonitrile content in the copolymer, the more effective is the 12687 resin.

parent upon inspection of the results obtained with Compound B and Compound F.

Compound D illustrates that smaller percentages of 12687 resin can be used along with some carbon black for plasticization during mixing and compounding. Tensile strength equivalent to that of a compound containing only carbon black in an amount equal to the combined weight of the resin and carbon black in Compound D was found.

Summary and Conclusions

The advantages which result from the use of a new thermosetting phenolic resin, Durez 12687, when compounded in Buna N and other synthetic rubbers, have been explained, and compound formulae and physical test data given illustrate some of these advantages. This new resin is particularly useful for compounding hard and semi-hard synthetic rubber stocks.

New Blowing Agent

(*Continued from page 212*)

can probably be obtained by experienced compounders.

Table 4. Cellular GR-S Ebonite

	K
GR-S (15 min. break)	100.
SRF furnace black	30.
MT thermal black	50.
Zinc oxide	3.
Unsaturated petroleum softener	70.
N-cyclohexyl 2-benzothiazole sulfenamide	3.
Phenyl beta naphthylamine	1.
Sulfur	50.
Blowing Agent No. 15	9.
Physical Properties	
Press cure at 324° F. (min.)	105.
% blow	280.
Apparent density (oz/cu. in.)	0.20

Table 5. Reclaimed Rubber Cellular Products

	L	M
Whole tire reclaim	100.	100.
MT thermal black	40.	....
Whiting	....	40.
Zinc oxide	3.	3.
Stearic acid	2.	2.
Benzothiazyl disulfide	1.	1.
Tetramethyl thiuram monosulfide	....	0.2
N-cyclohexyl 2-benzothiazole sulfenamide	0.2	....
Phenyl beta naphthylamine	1.	1.
Process oil (Circo)	30.	25.
Sulfur	3.	3.
Blowing Agent No. 15	5.	5.
Physical Properties		
Press cure at 311° F. (min.)	15.	15.
% blow	360	450
Apparent density (oz./cu. in.)	0.16	0.14

Reclaimed Rubber Products

Most compounders have had more experience in working with reclaimed rubber than with GR-S and Buna N. The formulae of Table 5 are therefore offered merely as guides in converting present formulae to the use of Blowing Agent #15 and are not suggested as finished commercial compounds.

Summary and Conclusions

A new blowing agent, consisting of a mixture of biuret and urea, has been described with special attention to the advantages of its use for the production of sponge or cellular rubber from the various synthetics and reclaim. Laboratory formulae for the use of this Blowing Agent #15 with GR-S, Buna N, and reclaimed rubber have been given, together with some properties of the resulting end products, in order to show the possibilities of this blowing agent for cellular rubber.

Study of "H" Test

(*Continued from page 217*)

found to have no effect. Storage of uncured rubber stock at low temperature (approximately 45° F.) before building test pads was found to be important.

The force required to separate a cord from rubber was found to increase linearly with the gage and requires an adjustment when comparing tests of cords having different gages. The characteristic adhesion was defined and shown to give a practical estimate of adhesion. The twist of a cord was found to have a small influence on adhesion, and adjustment formulae were given to permit comparison of cords having different twists.

A description is given of a recommended procedure for conducting the "H" adhesion test. The proposed method, based on the findings of this study, aims to provide means for evaluating or holding uniform those factors having significant effects on the results. Data accumuated during the study reveal that the standard error in the characteristic adhesion obtained by use of the proposed method may be expected to be about 5% at normal room temperature and about 6% at 275° F.

EDITORIALS

What If Plastics Industry Production Volume Equals That of the Rubber Industry?

THE attendance record set by the first National Plastics Exposition, held at Grand Central Palace in New York, April 22 to 27, and the information contained in some of the papers presented before the Society of the Plastics Industry's annual conference, brought into bold relief the phenomenal growth that has taken place in the size of this sister industry during the last decade. It is a little difficult to realize that while the rubber industry in this country has been using one-half to three-quarters of a million long tons of rubber in the period prior to World War II and is now consuming rubber at a rate of about one million tons annually, the plastics industry has increased its consumption of resins and plastics from about 54,000 long tons in 1935 to about 400,000 long tons in 1945 and is using its basic raw materials at a rate of about 450,000 tons a year at the present time. Furthermore additional capacity for the production of 135,000 tons of synthetic resins by July 1, 1947, is contemplated, according to W. Stuart Landes, president of the Plastic Materials Manufacturers Association. Mr. Landes also predicted that by 1955, capacity for the production of all synthetic resin and plastic materials should be between 1,100,000 and 1,600,000 long tons.

This growth is no news to many of the companies in the rubber industry, who both during and before the recent war have become more and more involved with processing plastic materials along with rubber in their plants, and, in some instances, have themselves also become suppliers of synthetic resins and plastics. There is one aspect of this situation which concerns all members of the rubber goods manufacturing industry and the producers of both natural and synthetic rubber and to a lesser extent the producers and users of synthetic resins and plastics. For many products other than tires, the greater the use of not only synthetic rubbers, but also synthetic plastics, the smaller the use of natural rubber. In other words, instead of there being only a competition between natural and synthetic rubbers for use in many industrial and retail consumer goods, the competition will be between natural rubber, synthetic rubber, and synthetic plastics.

H. E. Fritz, director of research for The B. F. Goodrich Co., emphasized this fact when in an article in INDIA RUBBER WORLD for August, 1945, in our new Plastics Technology section, he said: "A full realization of the similarity of the purposes, materials, and the techniques of the plastics industry is of the utmost importance in postwar planning." Dr. Fritz continued: "Rubber in its vulcanized form is itself a thermoplastic, and many of the processes and much of the machinery and equipment of the rubber factory can easily be adapted to plastics. For these reasons there are many who hold that rubber manufacture and plastics manufacture should be classed together as a single industry, in which, to be sure, rubber was the first product to be developed on a large scale and is still by far the largest item."

If the predictions of Mr. Landes of the PMMA are realized, rubber may no longer be "the largest item." In articles which have appeared or will soon appear in INDIA RUBBER WORLD since August, 1945, we have tried to call attention to the materials and processes that have been developed and improved during the last few years for fabric coating, packaging, laminating, post-forming, and the use of non-rigid elastomeric plastics in the production of many molded industrial items, the latter previously made almost entirely from rubber. We have also recently sought to point out the progress that has been made in blending or using as compounding ingredients for rubber, the various synthetic resins and plastics. These developments were described by H. A. Winkelmann, of the Dryden Rubber Co., before the Society of Plastics Engineers early this year and published in the March issue of INDIA RUBBER WORLD.

Surveys of the future outlook and earning prospects of the rubber industry by investment banking houses and statements made by several rubber company heads during the last few months have all stressed the very great importance of increasing the diversification of products of the rubber industry as the best means of maintaining earnings at a high level after the "pent-up demand" for old-line products has been satisfied. If the output of plastic raw materials is to equal that of rubber raw materials, it seems worth while to call attention to the obvious fact that these plastic materials provide one of the easiest ways of achieving to a small or large degree a diversification of products of established rubber goods manufacturing companies, and, we might add, with the minimum effect on existing production operations and with a more than usual opportunity for profit. In this connection we of INDIA RUBBER WORLD would welcome an expression of opinion from our readers with regard to the possibility of a gradual merging of the rubber and plastics industry during the next five or ten years and the advantages and disadvantages to be derived therefrom.

Scientific and Technical Activities

Wartime Developments Feature A. C. S. Rubber Division Meeting

THE first postwar meeting of the Division of Rubber Chemistry, which began on the afternoon of April 10, and the High Polymer Forum held jointly with the Divisions of Paint, Varnish & Plastics, Cellulose, Colloid, Organic, and Physical & Inorganic Chemistry of the American Chemical Society, which was held April 9 and the morning of April 10, were featured by a large number of papers devoted to the discussion of research and development problems worked on during the period of the past war, public presentation of which had been restricted up to this time. Of the 54 papers given before the Rubber Division and the High Polymer Forum, about 12 might be classed as dealing with the fundamental aspects of the polymerization process, 12 as concerned with the relation of the properties of the polymers to molecular structure, eight with the properties of new rubbers and resins, seven with new compounding ingredients, six with the subject testing, four with latices, four with the chemistry of vulcanization, and one with a finished end-product.

Registration for the Rubber Division totaled about 1,000, and several hundred were in attendance at the technical sessions of the High Polymer Forum. Registration for the entire Society was in the neighborhood of 8,500.

Rubber Division Meetings

W. A. Gibbons, chairman of the Division of Rubber Chemistry, in his opening remarks at the beginning of the technical sessions of the Division on the afternoon of April 10 stressed the effect of World War II on the industry, which after 100 years of development of the production and use of natural rubber was required in a year or so to develop and use synthetic in its manufacturing processes. He emphasized that one of the reasons why rubber has always so well fulfilled the expectations of its consumers is the ability of its technicians. He pointed out that in the postwar period, rubber and its products will be constantly expanding in volume and importance and that new rubbers and new techniques will add steadily to the excellence and diversity of these products.

Abstracts of papers presented before the Rubber Division were published in our March issue, except for the one describing the Charles Goodyear Lecture. This was given by Waldo L. Semon, of The B. F. Goodrich Co., and had for its subject, "Research Leading to Commercial Butadiene Synthetic Rubber." Dr. Semon was elected Charles Goodyear Lecturer for 1944, but because of the cancellation of the 1944 fall meeting of the Society and the cancellation of all meetings during 1945, he was prevented from presenting his paper until this time. The accompanying photograph shows Dr. Semon receiving the congratulations of Dr. Gibbons just before delivering the Goodyear Lecture on the morning of April 11.



INDIA RUBBER WORLD *Staff Photo*

Waldo L. Semon, Charles Goodyear Lecturer, Receiving the Congratulations of W. A. Gibbons, Rubber Division Chairman, before Presenting His Paper at Convention Hall

The Charles Goodyear Lecture for 1944. At the time Charles Goodyear discovered vulcanization, it is safe to say that neither he nor anyone else understood the molecular structure of rubber or the chemical reaction responsible for the profound change in physical properties that occurred during the process. Now we know that natural rubber is only one member of a wide class of materials that have the property of elasticity, characterized by the ability after being stretched 200 to 1000% of being able to return forcibly and rapidly to subsequently their original dimensions. Thus rubber is a generic term and should be considered as one of the typical states of matter in the same class with crystals, fibers, glasses, and resins. Any material composed of a tangle of long linear molecules subject to lateral molecular motion similar to that in a liquid may be termed a "rubber."

For greatest commercial value a rubber should be capable of vulcanization; that is, after it has been formed into the desired shape, it should be possible to cause some chemical change to occur so that the linear molecules are no longer free, but are cross-bonded or netted together to restrict plastic flow. It is not necessary to duplicate the precise chemical structure of natural rubber in order to have a synthetic rubber-like material. It is merely necessary to build up long molecular chains which retain lateral molecular freedom. Theoretically this building up can be done in a large number of ways. Two types of simple organic molecules that can be caused to join together by polymerization are vinyl compounds and conjugated dienes. The problem of devising a synthetic rubber resolves itself into making a large number of polymers and copolymers of vinyl compounds and dienes under varying conditions and evaluating the polymers as rubbers. Some ideas of the tremendous amount of work required in the research and selection of synthetic rubbers may be gathered from the fact that prior to Pearl Harbor there were prepared and evaluated in our laboratory 14,492 different synthetic rubbers. Of these less than 100 were considered worthy of pilot-plant trial for commercial development. The total number produced and used on a commercial scale is only about a dozen. Seventy-nine patents were issued in 1945 covering the laboratory and pilot-plant work. The total number of patents issued to all workers in the field of polymerization, treatment of latex, compounding, and use of synthetic rubber in 1945 was 158.

The process of making synthetic rubber is discussed in detail, first quoting in part from U. S. patent No. 2,362,052, D. Craig to B. F. Goodrich Co., November 7, 1944. This patent lists the main variables to be considered in polymerization work, but does not disclose why the various components were chosen or the different processes were conducted. Research leading to the development of commercial synthetic rubber had to do largely with the systematic study of these variables and the selection of those raw materials and conditions which would produce a satisfactory synthetic rubber at a low enough cost to be used commercially.

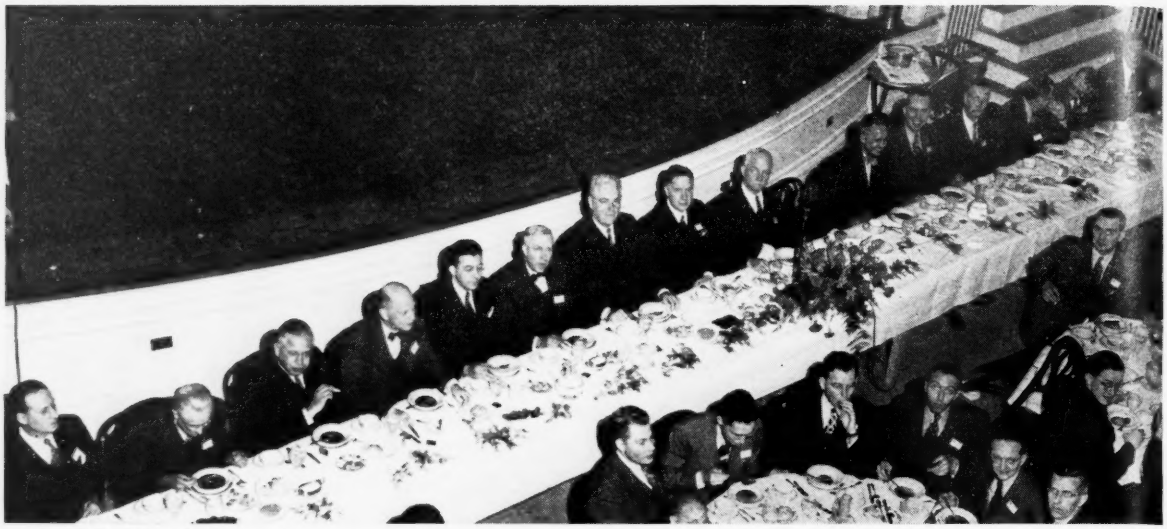
The function of each of the ingredients and steps, as set forth in the description of the patent, is considered. Items discussed are butadiene, styrene and other comonomers, ratio of diene to comonomer, water, emulsifying agents, modifiers, polymerization accelerators, inhibiters of polymerization, polymerization initiators, temperature and time of reaction, degree of conversion, ratio in which reactants combine, formation and treatment of latex, the coagulation process, drying and packaging, and the use of synthetic rubber.

The synthetic rubber industry, as we have it today, is the result of group effort. Chemists, engineers, and production men all contributed their utmost to the project. The success of the project can be measured in several ways: (1) The plants, as soon as completed, started turning out synthetic rubber of satisfactory quality. (2) Productive capacity of every plant exceeded design capacity. (3) Production costs were lower than estimated and have been continually decreasing.

During 1945 the production of butadiene synthetic rubber was greater than our highest prewar consumption of natural rubber. In these plants, for instance, in 1945 were produced 830,000 long tons of GR-S, which is about 1,860,000,000 pounds. Better synthetic rubber tires are being made continually. Passenger tires of a quality better than the best prewar tires are even now being made 100% from GR-S.

The Rubber Division Banquet

The banquet of the Rubber Division was held the evening of April 11 in the main ballroom of the Chelsea Hotel and was attended by about 850 members and guests. Credit for an excel-



INDIA RUBBER WORLD *Staff Photo*

Speakers' Table at the Rubber Division Banquet, Hotel Chelsea, April 11: (Left to Right): M. F. Torrence (du Pont), Division Sergeant-at-Arms; C. C. Davis (Boston Woven Hose), Editor, Rubber Chemistry and Technology; A. H. Nellen (Lee Tire), and S. G. Byam (du Pont), Division Directors; H. I. Cramer (Sharples), Division Secretary; W. W. Vogt (Goodyear), Division Vice Chairman; Col. Bradley Dewey (Dewey & Almy), President, A. C. S.; W. A. Gibbons (U. S. Rubber), Division Chairman; Charles L. Parsons, retiring Secretary, A. C. S.; C. W. Christensen (Monsanto), Division Treasurer; Harry G. Bimmerman (du Pont), Chairman, Local Committee; Fred Amon (Cabot), Division Director; Walter J. Murphy, Editor Industrial and Engineering Chemistry; and B. S. Garvey (Goodrich) and C. R. Haynes (Binney & Smith), Division Directors.

lent meal and an entertainment program of interesting and varied character is due to Harry G. Bimmerman and his local committee on arrangements.

Honored guests seated at the speakers' table consisted of Col. Bradley Dewey, president of the A. C. S. and former Rubber Director; Charles L. Parsons, retiring secretary and business manager of the A. C. S.; Alden H. Emery, the new secretary and business manager of the A. C. S.; and Walter H. Murphy, editor of *Industrial and Engineering Chemistry* and *Chemical and Engineering News*. Members of the executive committee of the Division, Mr. Bimmerman, and honored guests (except Mr. Emery, who was absent at the time the picture was taken) are shown in the accompanying illustration.

Colonel Dewey, in a few brief remarks made at the banquet, complimented the members of the Rubber Division on their work in connection with the synthetic rubber program during and following the war period and in addition commended them for their unity and morale in connection with the activities of the Division of Rubber Chemistry. He expressed the opinion that an equal amount of spirit in some of the other Divisions would result in much overall benefit to the Society as a whole.

The Business Meeting

The business meeting of the Rubber Division was held in the ballroom of Convention Hall at the conclusion of the technical session for the morning of April 12. Chairman Gibbons first called for the report of the nominating committee headed by John T. Blake, of Simplex Wire & Cable Co. Nominations for officers of the Division for the year 1947, to be elected by letter ballot and the results announced at the fall meeting of the Division, follow: for chairman, W. W. Vogt, Goodyear Tire & Rubber Co.; vice chairman, Harry Outcault, St. Joseph Lead Co., and R. A. Schatzel, Rome Cable Corp.; treasurer, C. W. Christensen, Monsanto Chemical Co.; secretary, C. R. Haynes, Binney & Smith Co.; sergeant-at-arms, C. R. Cuthbertson, United States Rubber Co., and L. M. Baker, Mansfield Tire & Rubber Co. For directors, the following were nominated: G. L. Allison, Goodrich; Norman Grace, Dunlop Tire & Rubber Goods Co.; S. D. Gehman, Goodyear; W. J. Geldard, U. S. Rubber; G. H. Swart, General Tire & Rubber Co.; F. W. Frericks, Cupples Co.; and A. M. Neal, E. I. du Pont de Nemours & Co., Inc. As no additional nominations came from the floor, the nominations were accepted by the membership.

Harry Outcault, chairman of the committee on membership, was next called upon to make his report. He explained that because of the shortage of paper for publication of *Rubber Chemistry and Technology*, his committee could not become active until July, 1945, but its work since that time had resulted in 228 new active members of the Division and 37 new associate members. New members for the American Chemical Society totaled 42. Membership in the Division of Rubber Chemistry as of April 1, 1946, amounted to 1,271 active members, 257 associate members, and eight honorary members, making a total of 1536. There are also 299 subscription members for *Rubber Chemistry and Technology*.

John McGavack, of U. S. Rubber, chairman of the committee on rubber bibliography, then reported on the activities of this committee, other members of which were C. C. Davis, Boston Woven Hose & Rubber Co.; Mr. Christensen, and M. E. Lerner, *Rubber Age*. Dr. McGavack mentioned that the work of the bibliography committee since 1944 would be culminated in May with the mailing to all members of the Division of a 400-page volume of a bibliography of literature on rubber for the period 1940-41. It was further stated that of the $3,000 allocated to this committee, all was being returned to the treasurer of the Division, together with an additional $3,000 realized from the sale of advertising appearing in the publication. Dr. McGavack particularly commended Mr. Lerner for his very great help in the preparation of this 1940-41 bibliography publication.

On the subject of the next meeting of the Division, Dr. Gibbons reported that the Rubber Division was planning to join the parent society for the fall meeting scheduled for September 9 through 13 at Chicago, if adequate hotel accommodations could be obtained for members of the Division. If it is not possible to join with the rest of the Society for the meeting in Chicago, the Rubber Division will probably hold its meeting at about the same time in some other city, probably Cleveland.

H. I. Cramer, secretary of the Division, was called upon to report on the work of the committee responsible for the preparation of the new by-laws. He stated that copies of the new by-laws had been mailed to members of the Division, and the results of letter balloting showed 558 votes for and seven votes against their adoption. Dr. Gibbons pointed out that it was necessary for the new by-laws to be submitted to the council of the American Chemical Society for final approval and called for a motion to take such action, obtain the necessary approval, and adopt the by-laws for the Division. The motion was made, seconded, and carried by a voice vote.

Dr. Gibbons also took the occasion to comment on some of the changes in the new by-laws, particularly that part relating to the new policy of the Division to give more encouragement to local groups. The Division may sponsor local groups following application to the executive committee by these

groups and a decision by the Division for such sponsorship. The sponsored groups may indicate their relation to the Division by use of the following wording on letterheads and membership cards: "————————— Rubber Group, Sponsored by the Division of Rubber Chemistry, American Chemical Society." The new by-laws state, however, that the rules of the American Chemical Society do not permit the use of the Society's insignia or seal in this connection. Membership in a Rubber Group of itself does not entitle a person to any more privileges in the A. C. S. or the Division than the person would enjoy without Rubber Group membership. To foster progress and achievement by local groups, the new by-laws now provide that the directors of the Division shall consist of, first, as many elected directors as there are sponsored Rubber Groups, and, further, that one director shall be elected from the active members of the Division located in the area served by each sponsored Rubber Group. The slate prepared by the nominating committee of the Division will consist of two active members for vice chairman, one active member for secretary, one active member for treasurer, and at least two members resident in each section served by a sponsored Rubber Group, for the position of director.

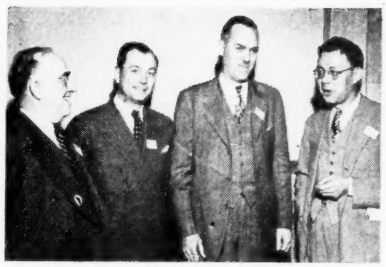
It was also announced that the Charles Goodyear Lecture Award would henceforth be known as the Charles Goodyear Medal and that in the future the executive committee of the Division shall constitute the Medal Committee.

A motion was made by Dr. Blake that with the planned retirement of Dr. Cramer from the post as secretary of the Division and the nomination of Mr. Haynes to that office, Mr. Haynes should be elected as assistant secretary for the balance of the current year in order that he might have an opportunity better to acquaint himself with his new duties before taking the position as secretary in 1947. The motion was seconded and carried by voice vote, and Mr. Haynes became assistant secretary of the Division for the remainder of 1946.

Immediately following the adjournment of the business meeting a luncheon for the chairmen of the various local rubber groups was given by the executive committee of the Division.

The High Polymer Forum

The High Polymer Forum, sponsored by the Division of Paint, Varnish & Plastics Chemistry with the cooperation of the Divisions of Cellulose, Colloid, Organic, and Physical & Organic Chemistry, got under way on the morning of April 9 with introductory remarks by A. C. Elm of N. J. Zinc Co., chairman of the Division of Paint, Varnish & Plastics Chemistry, and P. J. Flory, of Goodyear. Dr. Elm said that the High Polymer Forum was an outgrowth of the difficulties at the New York meeting of the Society in the Fall of 1944, when papers of interest to workers in the field of high polymers were scheduled at so many different places and often at conflicting times so that adequate coverage was impossible. Chairmen of the interested Divisions were organized to plan a joint symposium and also constituted with other members of the various Divisions a review committee for papers offered for presentation at the Forum. R. H. Ball, of the Celanese Corp. and the Paint, Varnish & Plastics Division, was appointed chairman of the Forum committee. Dr. Elm explained that the papers scheduled for the first half-day session (the first four abstracts) were those previously arranged by Dr. Flory for a Symposium on the Physical Chemistry of Copolymers and Copolymerization to be presented before the Division of Physical and Inorganic Chemistry. The remainder of the papers were selected by Drs. Ball, C. S. Fuller, of Bell Telephone Laboratories, Frank R. Mayo, of U. S. Rubber, and Dr. Flory. The High Polymer Forum had been scheduled for the September, 1945, meeting of the Society in Chicago, but had been postponed with the cancellation of this meeting by ODT.



INDIA RUBBER WORLD *Staff Photo*

At Convention Hall during the Rubber Division Program: (Left to Right): Jack Britton (Stanco Distributors); E. H. Krisman (du Pont); W. F. Tuley (Naugatuck Chemical); A. E. Boss (Pittsburgh Plate Glass)

Dr. Elm then introduced Dr. Flory, who after a few additional remarks, presided at the first morning session on April 9. Dr. Ball presided at the afternoon session on April 9 and the morning session on April 10. Dr. Flory pointed out that in the field of high polymers, composition *vs.* properties was not a straight line relation and therefore required rather extensive research and investigation. He mentioned that condensation copolymers offered one of the best means of studying this relation and then introduced Dr. Fuller, who presented the first paper of the High Polymer Forum, this paper being on the subject of condensation polymers.

Abstracts of High Polymer Papers

Abstracts of papers presented before the High Polymer Forum were not available for publication together with those presented before the Division of Rubber Chemistry in the March issue of INDIA RUBBER WORLD and are therefore given now. One exception was the paper by W. O. Baker and N. R. Pape, of Bell Laboratories, which was repeated as part of the program of the Rubber Division and thus appeared in our March issue.

Disorder In Linear Condensation Copolymer Solids. On X-ray examination, solid linear organic polymers exhibit a wide range of order in regard to the manner in which the individual chain segments pack with respect to one another. Most polymers consist of a dispersion in one another of two or more phases representing different degrees of order. Such phases in general are not in thermodynamic equilibrium. Within a given phase a degree of order approaching that observed in the single crystals of low molecular compounds may be reached. Often dispersed phases of different crystal structure exist side by side.

In the present paper the effects of chemically combining units of different chemical structure in the same chain molecule are considered from the standpoint of the disordering influence on two features of order, prominent in simple condensation polymers: namely, (1) planes of polar groups perpendicular or inclined to the molecule axes, and (2) planes parallel to the molecule axes.

Copolyesters and copolyamides prepared from pure starting ingredients have been employed in order to study these effects. Polyamides in which progressively increasing amounts of N-methyl substitution are introduced exhibit striking changes in intensity of certain planes parallel to the molecule axes. These changes result from disordering introduced into the opposing set of polar group planes. In copolyesters and copolyamides which are disordered by the introduction of different-length hydrocarbon spacers between the polar layers, strong X-ray reflections are observed in some instances which correspond to the average spacings of the different residues. This behavior is similar to that found for mixtures of low molecular chain compounds. C. S. Fuller and W. O. Baker, Bell Laboratories, Murray Hill, N. J.

Relative Activities of Ethylene Derivatives In Copolymerization. Data will be presented on the rates of peroxide-catalyzed polymerization of some monomers alone. These data are of qualitative interest, but of no quantitative significance. Studies of copolymer compositions, however, permit quantitative comparison of reaction rates for a number of ethylene derivatives with several types of free radicals. In a few copolymerizations the relative activities of the two monomers are independent of which type of radical chain ending is attacking them. In a few other copolymerizations the radical derived from one monomer will add only to the other monomer so that the monomers alternate in the copolymer. The great majority of monomer pairs lies between these extremes: there seems to be a general order of activity of monomers in copolymerization, on which is superimposed (as a next approximation) a tendency of monomers to alternate in copolymerization. This alternation tendency may arise from at least three causes. The general order of activity in copolymerization is associated with conjugation of other groups with the ethylene bond, but has no apparent relation to the rates of polymerization of monomers alone. These observations, together with considerations of some rate phenomena in copolymerization and of the reactivities of some *cis* and *trans* - isomers, are entirely consistent with the conclusions that resonance stabilization of the activated complex is a major factor in determining

activities in copolymerization and that this stabilization is highly dependent on the coplanarity of the conjugated groups. Frank R. Mayo, U. S. Rubber, Passaic, N. J.

Some Recent Results In The Field Of Copolymerization. Recent experimental studies on copolymerization, carried out at Brooklyn Polytechnic Institute and now in the process of publication, will be reviewed. The following systems will be included:

Styrene—ethyl methacrylate
Styrene—butyl methacrylate
Styrene—hexyl methacrylate
Styrene—allyl chloride
Stryene—allyl bromide
Methyl methacrylate—allyl chloride
Styrene—chloroprene
2,5-dichlorostyrene—methyl methacrylate
2,5-dichlorostyrene—acrylonitrile
2,5-dichlorostyrene—butadiene

A second part of the paper will deal with some recent theoretical developments in the field of copolymerization —particularly with the extension of Wall's treatment of the removal of substituents from a random copolymer chain.

It would be extremely useful to be able to describe the copolymerization behavior of a series of monomers by numbers assigned to the individual monomers, rather than to pairs of monomers. If such a simplification could be obtained, each monomer would only have to be studied quantitatively with a limited number of other reference monomers; then the behavior with all other monomers in the group could be calculated.

In the case of the four monomers so thoroughly studied by Mayo and coworkers—styrene, methyl methacrylate, vinylidene chloride, and acrylonitrile—such a simplification appears possible. Each monomer can be characterized by two numbers. The first is a measure of the "general reactivity" of the monomer with free radicals; the second is a measure of polarity. In order of decreasing "general reactivity," the monomers are arranged in the following order: styrene, methyl methacrylate, acrylonitrile, vinylidene chloride. With respect to "polarity," the double bond in styrene is negative, that in acrylonitrile positive, and those in methyl methacrylate and vinylidene chloride are in between. These relations will be discussed in terms of the electronic structures of the various monomers. Turner Alfrey, Jr., Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Partial Conversion Properties of Copolymers. When a copolymerization reaction is carried out, the product obtained will generally be heterogenous in nature. This heterogeneity results from the fact that the products formed at different stages of conversion exhibit different properties. Accordingly the final product is a mixture of polymers.

Copolymer heterogeneity can manifest itself in several ways. First of all, there can be variations in molecular weight or molecular size. Secondly, there can be differences in molecular shape as affected by branching or by cross-linking. Finally, in the case of copolymers, there can be widespread variations in composition or monomer make-up.

To obtain a better description of the nature of the copolymer which forms at each stage of the conversion, it is convenient to introduce the concept of "partial conversion properties" somewhat in analogy to partial molar quantities. A partial conversion property is the value of a property which can be associated with the polymer forming at any instant during the conversion. Thus the partial conversion molecular weight, at say 20% conversion, is the molecular weight of the polymer which forms at 20% conversion, but it is not the average molecular weight of all the polymer formed up to that conversion.

Formulae have been derived for the determination of partial conversion properties from a knowledge of the properties as functions of conversion. The GR-S system is used for examples. Frederick T. Wall, University of Illinois, Urbana, Ill.

Copolymerization of Vinyl Compounds With Dienes. An experimental study was made of the copolymerization reaction in the systems styrene-chloroprene and 2,5-dichlorostyrene-butadiene. Monomer mixtures ranging in composition from 10 to 90% diene were polymerized in mass to a low degree of conversion. The resulting copolymers were isolated (using the frozen benzene technique) and analyzed for chlorine. By this means the relative values of the various propagation rate constants were determined.

Dichlorostyrene-butadiene monomer mixtures containing 68 mole per cent. of butadiene form copolymers of the same composition. This particular composition was therefore chosen for further study. Polymerization was carried out to varying degrees of conversion, and the copolymers were isolated and studied by means of viscometric and osmometric measurement. As the degree of conversion was increased, the osmotic molecular weight and the intrinsic viscosity of the copolymer increased. This is interpreted as being due to the fact that the residual unsaturated group of a butadiene molecule in the copolymer chain can enter into the copolymerization reaction, forming a cross link. At very high degrees of conversion, the copolymer becomes partially insoluble. A. Goldberg, Turner Alfrey, and W. P. Hohenstein, Polytechnic Institute of Brooklyn.

Copolymerization. The Composition Distribution Curve. When two or more monomers are copolymerized, the product is a mixture of polymer molecules which vary in composition as well as in chain length. Some mixtures of monomers yield a polymer aggregate of fairly uniform composition; while others give a product whose molecules vary so widely in composition that technical usefulness is impaired.

The distribution of compositions in a copolymer may be found from the relation:

$$1N\frac{M}{M_o} = \int_{A_o}^{A} \frac{dA}{A_p - A}$$

where M_o is total number of moles of monomers at start; M, of unreacted momomers; A_o, mole fraction of component A in original monomer mixture; A, mole fraction of component A in remaining monomer; and A_p, mole fraction of component A in the polymer just being formed.

This equation may be used to determine the composition distribution curve for a system of any number of components. Application to binary and ternary systems is illustrated. I. Skeist, Celanese Corp. of America, Newark, N. J.

The Viscosity of Dilute Solutions of Long-Chain Molecules. The Initial Concentration Dependence Constant. The constant, k', characterizing the initial variation of the specific viscosity with concentration, is discussed, primarily with reference to its dependence on various structural and energy factors. Alternative methods for determining this constant from experimental data are compared. Numerous values of k', mostly computed from data in the literature, are presented and discussed. Maurice L. Higgins, Kodak Research Laboratories, Rochester, N. Y.

The Thermal Polymerization of Methyl Methacrylate. With the use of suitable precautions, exclusion of air and light and, preferably, the presence of an antioxidant such as hydroquinone, methyl methacrylate has been found to give a reproducible rate of thermal polymerization in the temperature range 100 to 150° C. At 131° C. the overall rate constant is 3.25×10^{-6} mole per liter per second, and the overall activation energy 16 kcal. per mole. Combining these results with the data of Schulz and Blaschke[1] on the benzoyl peroxide catalyzed reaction, the chain initiation step (assumed bimolecular) has a rate constant of 6.54×10^{-13} at 131°, an activation energy of 22 kcal., and a frequency factor with the remarkably low value of 0.36. Further, at 131°, kinetic chain lengths are very long (approximately 3,000,000) but, owing to chain transfer, the measured degree of polymerization is only about 7,500. The exceptionally long kinetic chain lengths are suggested as the reason for the difficulties previously encountered obtaining consistant thermal polymerization rates with this monomer. Cheves Walling and Emorene R. Briggs, U. S. Rubber. Passaic.

The Temperature Dependence of the Osmotic Pressure of Polyvinyl Chloride Solutions. An osmometer of the Montonna-Jilk-Fuoss type has been modified to permit its enclosure in a specially constructed thermostat. Precise osmotic pressure measurements have been made over the temperature range 0° to 80° C. Measurements of polyvinyl chloride in dioxane, methyl ethyl ketone, and cyclohexanone have been made as a function of concentration and temperature. Since osmotic pressure is a measure of the free energy of dilution, $\Delta\bar{F}_1$, the heat of dilution can be evaluated from the temperature dependence of osmotic pressure by means of $(\partial \Delta \bar{F}_1/T) / (\partial 1/T) = \Delta \bar{H}_1$. Van Laar's equation appears to hold over the concentration range studied (0 to 1%); hence the results can be given as values of $\Delta \bar{H}_1/v_2^2 = o<$. The quantity μ, commonly used in thermodynamics of polymer solutions, can be represented by $\mu = \beta + \alpha/RT$

[1] Z. physik. Chem., B 51, 75 (1942).

where β is an entropy term, R is the gas constant, and α is as defined above. For dioxane, $\mu = 0.15 + 212/RT$; for methyl ethyl ketone, $\mu = 0.47 - 37/RT$; for cyclohexanone, $\mu = 0.44 - 123/RT$. These results are discussed in terms of recent thermodynamic theories of polymer solutions. Paul Doty and Eli Mishuck, Polytechnic Institute of Brooklyn.

A General Theory of Emulsion Polymerization With Respect to Reaction Loci. Treatments of the reaction kinetics of emulsion polymerization thus far published are incorrect, owing to neglect of the loci involved.

Locus 1 (Initiation). The polymer particles are initiated in extremely thin [ca. 10 A. layers of oil (monomers plus mercaptan)] in a soap micelle. This consists of a pile of double layers of oriented soap molecules which alternate with water layers (ca. 50 A. thick with 3% soap). In each double layer the hydrocarbon groups of the soap are oriented toward each other, with the polar groups toward the water layer.

In the beginning no oil is present in the micelles, but the oil molecules diffuse from the surface of the emulsion droplets through a moderately thick diffusion layer and are trapped in the micelles. The monomer then polymerizes, and the polymer is ejected from the micelle into the acqueous phase as extremely small polymer particles. More monomer diffuses into the micelle, and the process continues.

Locus 2 (Production). Monomer diffuses from emulsion droplets into polymer particles, where it polymerizes. At 12 to 13% conversion no micelles are left because of adsorption of soap by polymer-monomer particles (diameter ca. 300 A.). This eliminates Locus 1.

Locus 3. Some polymer particles are initiated and grow in the aqueous phase.

Locus 4. A monomer droplet loses most of its volume by diffusion, but leaves a minute polymer particle residue. No monomer droplets remain after about 50 to 60% conversion. Loci 3 and 4 are relatively unimportant. William D. Harkins, University of Chicago. (Work done in connection with the Government Research Program on synthetic rubber under contract with the Office of Rubber Reserve, Reconstruction Finance Corp.) Presented by George Jura in the absence of Dr. Harkins.

The Thermal Polymerization of 2-Vinyl Naphthalene. 2-Vinyl naphthalene, prepared by the catalytic dehydrogenation of ethyl naphthalene, was purified by recrystallization to 99.0% as indicated by the bromine number. It was thermally polymerized in bulk under nitrogen at 70, 80, and 90° C. to form clear brittle polymers, whose molecular weights ranged from 100,000 to 250,000. It was polymerized in emulsion at 65, 75, and 85° C. to form less brittle polymers with molecular weights ranging from 500,000 to 600,000. The energy of activation, determined from the induction period, was 23,000 cal. per mole for the bulk polymer, but was considerably less for the emulsion reaction.

Both the bulk and emulsion polymers were fractionally precipitated, and distribution curves were prepared from the fractions. Osmotic pressure molecular weights and viscosity measurements were made on the fractions. The logarithm of the molecular weights and (η) were plotted against each other to form a straight line for each polymer. The K and a of the Mark equation,

$$(\eta) = KM^a$$

were calculated and were used to determine the molecular weights of 2-vinyl naphthalene polymers from viscosity measurements. J. Marshall Grim, Wilmer E. Baldwin, and W. H. Hill, University of Pittsburgh and Mellon Institute of Industrial Research, Pittsburgh, Pa.

Elastic N-Substituted Polyamides. N-substituted polyamides are obtained when combinations of disecondary, secondary-primary, and diprimary diamines are polymerized with dibasic acids. The lateral substituents reduce hydrogen bonding and chain interaction, producing significant changes in physical properties—molecular structures being possible which result in polyamide fibers possessing long-range elasticity.

The following relations between chemical structure and physical properties have been observed:

1. The percentage of N-substitution produces properties varying from a hard, tough, unsubstituted polymer to a soft, tacky, plastic, 100% substituted polymer. Increasing the percentage substitution decreases melting point, crystallinity, tenacity, and modulus and increases solubility, elongation, and tackiness. The most attractive elastic polyamides are obtained in the range of 50 to 60% N-substitution.

2. The size and nature of the substituent group have little effect on phyical properties except for the methyl group. Methyl-substituted 610 polymers were more crystalline and orientable and did not possess the long-range elasticity characteristic of other alkyl-substituted 610 polymers.

3. The distribution of the substituent groups along the polyamide chain has a marked effect on lateral order. Methyl groups create less lateral disorder in the polar layers if they occur at regular, rather than irregular, intervals. This correlation is completely reversed with lateral groups larger than methyl. Increasing the amount of secondary-primary diamine in a mixture of diamines, while keeping the substitution constant at, for example, 50%, results in the same changes that are produced by increasing the substitution, provided the substituent group is ethyl or larger.

4. In changing the structural unit, if an odd-membered dibasic acid is used in place of an even-membered one, less N-substitution is required to produce a desired degree of long-range elasticity. Emerson L. Wittbecker, Ray C. Houtz, and W. W. Watkins, E. I. du Pont de Nemours & Co., Inc., Buffalo, N. Y.

Chain Transfer in the Polymerization of Styrene. The Reaction of Free Radicals with Carbon Tetrachloride. Solvents reduce the molecular weight of polymerizing styrene by donating an atom to the growing polymer radical, forming a polymer molecule and a new radical which starts another chain (hence the name, chain transfer). The polymerization was studied over a styrene-carbon tetrachloride ratio of 0 to 100, at 60, 100, and 132° C., and in the presence and absence of benzoyl peroxide. Number average molecular weights for unfractionated polystyrenes were determined osmometrically and by end group analyses and were found to be simply related to their intrinsic viscosities. Equations are presented which account for the average molecular weights of the products, each containing one carbon tetrachloride residue and an average of three to 10,000 styrene units. In an equimolar mixture at 100° a radical has 0.018-time as great a chance of reacting with carbon tetrachloride as with styrene; the activation energy for chain transfer is 4.1 kcal. per mole greater than for chain growth. These values are independent of the length of radicals containing from 2 to 10,000 styrene units, but the radical containing only one styrene unit is relatively less active in transfer. This work establishes the validity of a simple, accurate, and general method for comparing the reactivities of solvents with the radicals present in polymerizations. These methods are applicable to the synthesis of low molecular weight compounds. R. A. Gregg and Frank R. Mayo, U. S. Rubber.

Structural-Chemical Investigations of Rubbers by Stress Relaxation. The methods of continuous and intermittent stress relaxation provide a means of following the structural-chemical changes that occur in rubber net-works at elevated temperatures. These changes include chain scission and chain cross-linking induced by molecular oxygen as well as bond interchange, hydrolysis, and depolymerization. Among the rubbers studied were natural rubber, the Bunas, Butyl, neoprene, Lactoprenes, polyesters, polysulfide rubbers, and silicone rubbers. As can well be expected, these materials show a tremendous variation in relaxation characteristics which can be correlated with their chemical structure.

At sufficiently low temperatures stress relaxation provides a means of measuring the stability of secondary forces between the network chains. A very interesting effect is manifested in the stress relaxation of crystallizing neoprene.

At intermediate temperatures stress relaxation provides a means of following the extent of vulcanization. R. D. Andrews and A. V. Tobolsky, Princeton University, Princeton, N. J.

Degradation of Vinyl and Diene Polymers. Data are presented which reveal some of the relations between polymerization and degradation. Under certain conditions both reactions can be shown to occur simultaneously, leading to steady states. The factors accelerating degradation are discussed.

Studies were made to determine the factors controlling the oxidizability of vinyl and diene polymers as measured by oxygen absorption. It was shown that the chemical structure of the polymer generally plays the determining role. The presence of carbon to carbon double-bonds along the chain or methyl side groups is shown to have an accelerating effect on oxidation;

whereas negative side groups or negative linkages (such as amide or ester linkages) along the chain have a retarding effect on the rate of oxidation. Robert B. Mesrobian and Arthur V. Tobolsky, Princeton University.

Other Papers and Parson's Banquet

Most of the papers given before the regular sessions of the Paint, Varnish & Plastics Division and certain papers given before the Cellulose, Industrial and Engineering, Analytical, and Organic Chemistry Divisions are considered of interest, and their abstracts are therefore reprinted below.

A testimonial dinner was given on the evening of April 10 to Charles L. Parsons, retiring secretary and business manager of the Society, and was one of the features of the Society's program for the Atlantic City meeting.

The Parsons' Banquet

More than 1,000 members of the chemical profession honored Charles Lathrop Parsons of Washington, D. C., retiring secretary of the Society, at a dinner held in the ballroom of Convention Hall on Wednesday evening, April 10. Dr. Parsons, dean of American chemists, was presented with a gold medal by the Society for distinguished services to chemistry. He has been secretary of the Society for 38 years and business manager for 14. Dr. Parsons also received a bound volume of letters from several hundred chemists eulogizing his contributions to American science and industry. Copies of resolutions extolling Dr. Parsons' service, adopted by the majority of the Society's 110 local sections, were also included in the volume.

Prof. Marston T. Bogert, of Columbia University, president of the International Union of Chemistry, was toastmaster. Speakers included Harold W. Stoke, president of the University of New Hampshire; Wallace P. Cohoe, of New York, past president of the Society of Chemical Industry; Eric Rideal, of London, president of the Society of Chemical Industry; and Edward R. Weidlein, director of the Mellon Institute.

Additional Abstracts

Papers given before the regular sessions of the Division of Paint, Varnish & Plastics Chemistry were as follows:

Polytetrafluoroethylene, a New Heat-Resistant, Chemically Inert Plastic. Polytetrafluoroethylene, a new plastic currently being manufactured on an experimental plant scale by E. I. du Pont de Nemours & Co., Inc., is composed of carbon and fluorine in the form of difluoromethylene chains. This unique combination results in a chemically inert, heat-resistant, non-polar material which has many potential uses.

It is insoluble in all solvents thus far tried, including high-boiling ketones, esters, and hydrocarbons, and is not attacked below its melting point by any common corrosive agent except molten alkali metals. It will withstand temperatures up to 300° C. for long periods without serious degradation. An outstanding property is its combination of low power factor and low dielectric constant. This results in making the dielectric loss through the polymer over the entire range of power and radio



INDIA RUBBER WORLD *Staff Photo*

A Close-Up of Colonel Dewey, Dr. Gibbons, and Secretary Parsons at the Banquet of the Division of Rubber Chemistry

frequencies as low as, or lower than, that of polystyrene or polythene, which have been preeminent in this field, but which lack form-stability at elevated temperatures.

Polytetrafluoroethylene is sufficiently strong and tough for a diversity of applications. Its tensile strength ranges from 2,000 to 4,500 pounds per square inch, and its impact strength is about four foot-pounds per inch of notch. Under stress, the polymer exhibits plastic flow, which increases as the ambient temperature is raised. This behavior under compression can be largely overcome by partially confining the specimen and, in general, does not detract from the usefulness of the material. Although polytetrafluoroethylene is not outstanding in resistance to abrasion, it is to some extent self lubricating.

The principal current uses for polytetrafluoroethylene are gaskets and packing in equipment for handling hot corrosive liquids, and electrical insulation, particularly at high frequencies and under strenuous environments. Many other potential uses become apparent from a consideration of the properties of the material.

Polytetrafluoroethylene is being sold in small quantities for developmental purposes, under the trade name "Teflon," in the form of simple shapes such as tape, sheets, rods and tubes, gaskets of various sizes, and insulated wire. Because of difficulties in molding, more complex articles can be fabricated only by machining. M. M. Renfrew and E. E. Lewis, du Pont, Arlington, N. J.

Vinyl Alkyl Ethers. No review of the properties of vinyl ethers has been published previously in American chemical literature. Our paper surveys some of the more important chemical and physical properties of vinyl alkyl ether monomers, including along with our own work some German data of Reppe and co-workers which we have examined critically. The three vinyl alkyl ethers particularly studied are the methyl, *n*-butyl, and isobutyl which are being made available in limited quantities for research and development purposes in this country.

The lower vinyl alkyl ethers are characterized chemically by their polymerization by acid-type catalysts to give soft balsam-like, rubbery, or solid polymers, and by their hydrolysis with water or dilute acids to yield acetaldehyde and the corresponding alcohol. The vinyl ether monomers are relatively stable to alkali. They enter into several reactions of interest for synthesis. A method for purification of vinyl *n*-butyl ether and vinyl iso-butyl ether is discussed.

Some of the polymerization characteristics of vinyl methyl ether, vinyl *n*-butyl ether, and vinyl isobutyl ether are described. The monomers do not polymerize readily under the influence of heat or light even in the presence of organic peroxides. In contrast, polymerization initiated by acid-type catalysts, such as boron fluoride and aluminum chloride, may occur with almost explosive violence except at low temperatures or under specially chosen mild conditions.

The physical properties of vinyl alkyl ether polymers are very markedly affected by conditions of polymerization employed. The rubber-like high polymers of vinyl *n*-butyl ether and vinyl isobutyl ether undergo changes in properties on storage at room temperature and more rapidly when heated, except when containing suitable stabilizing agents, among which are materials of the antioxidant type. The application of vinyl alkyl ethers abroad and trade names employed will be sketched briefly. C. McKinley, C. E. Schildknecht and A. O. Zoss, General Aniline & Film Corp., Easton, Pa.

Copolymerization in Suspension (Pearl Copolymerization). The purpose of the investigation was to establish the conditions for the copolymerization of vinly-type monomers using the suspension polymerization method. As a first objective, the copolymerization of styrene and dichlorostyrene with a number of other monomers was studied. After the feasibility was established in general of the method by employing strict and specific reaction conditions for each of the systems, the special cases of methyl, ethyl, and butyl acrylates copolymerized, respectively, with dichlorostyrene were studied. The method which gave reproducible results for the preparation of copolymers in pearl form involved the use of concentrated salt and sugar solutions as suspension media together with small amounts of tricalcium phosphate as a suspension stabilizer.

The reaction rates of pearl copolymerization were studied and compared with those of emulsion copolymerization carried out under similar conditions.

The compositions of the suspension copolymers at various degrees of conversion were determined by chlorine analysis, and the same samples were used for a study of their viscosity and number average molecular weights. Similar investigations were carried out on emulsion copolymers produced under like reaction conditions. Summarizing, a comparison is made between suspension and emulsion copolymerization of dichlorostyrene and the methyl, ethyl, and butyl acrylates in respect to their reaction rates, composition, and number and weight average molecular weights of the copolymers at different stages of the reactions. W. P. Hohenstein and Fred Leonard, Polytechnic Institute of Brooklyn.

Properties of Monomeric and Polymeric Alkyl Acrylates and Methacrylates. The preparation and properties of various alkyl methacrylates, particul-

arly the *n*-alkyl esters, are described. Not all the *n*-alkyl methocrylates were prepared, but relations between certain physical properties and molecular weights of the monomeric esters were observed from which the properties of the missing members can be calculated.

The curve obtained by plotting brittle points of the polymeric *n*-alkyl methacrylates against carbon atoms in the alkyl group is similar in shape to the corresponding curve of the *n*-alkyl acrylates. The brittle points of the *n*-alkyl methacrylates decrease with increase in length of the alkyl group to the *n*-dodecyl ester (brittle point, −34° C.) and then increase. Cetyl methacrylate, the highest alkyl ester studied, had a brittle point of 15°. polymeric *n*-octyl acrylate has the lowest brittle point (−65°) of any of the esters examined.

Williams plastometer readings, obtained with polymers of *n*-butyl, *n*-amyl, *n*-octyl, and *n*-decyl methacryness. The plastometer readings depolymeric *n*-alkyl acrylates also decreased, indicating decreasing hardness, with increase in length of the alkyl group for the four methacrylates examined. An approximately straight line was obtained by plotting plastometer values against brittle points.

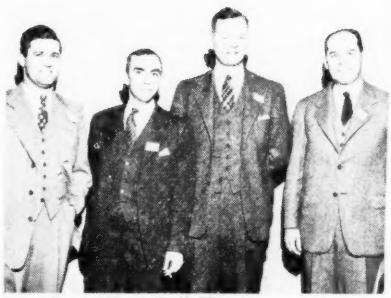
Williams plastometer values of the polymeric *n*-alkyl acrylates also decreased with increase in length of the alkyl group to approximately the nonyl ester. The plastometer values were proportional to the brittle points for the methyl to nonyl acrylates. C. E. Rehberg and C. H. Fisher, Eastern Regional Research Laboratory, Philadelphia, Pa.

Vulcanization of Various Chlorine-Containing Acrylic Elastomers. In earlier investigations it was observed that the 95% ethyl acrylate-5% 3-chloropropyl acrylate copolymer can be vulcanized readily with (a) sulfur and accelerators, (b) *n*-quinone dioxime and red lead, (c) dinitrobenzene and litharge, (d) Polyac, and (e) amines and amine condensation products. To obtain additional information on this new versatile method of vulcanization and to determine whether the halogen atom can be used generally instead of olefinic unsaturation for vulcanization, various chlorine-containing ethyl acrylate copolymers were prepared and studied.

The copolymers were made by the emulsion polymerization of 95% ethyl acrylate and 5% chlorine-containing monomer (vinyl chloride; vinyl-idene chloride; 2-chloropropene; 2,3-dichloropropene; 2-chloroallyl alcohol; 2-chloroallyl lactate; beta-chloroethoxyethyl acrylate; 2, 3-dichloropropyl acrylate; chloromaleic anhydride; dimethyl chloromaleate; di-*n*-butyl chloromaleate; di-2-chloroethyl maleate; and 2-chloroethyl vinyl ether). The copolymers were compounded by the recipes used previously with the chloropropyl acrylate copolymer, heated in standard rubber molds at about 300° F., and examined to determine whether vulcanization had occurred.

Most of the copolymers vulcanized satisfactorily, showing that the halogen atom is generally useful for vulcanization purposes. The various copollmers exhibited wide variations in molding characteristics, rate of vulcanization, and properties of the vulcanizates. Modified recipes were found preferable for some of the copolymers. The copolymer of 2-chloroallyl alcohol vulcanized most rapidly.

Considerable attention was given to the 95% ethyl acrylate-2-chloroethyl vinyl ether copolymer (designated Lactoprene EV), which yielded vulcanizates having outstanding resistance to oils, oxidation, and heat aging. W. C. Mast and C. H. Fisher, Eastern Regional Research Laboratory.



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Present at Technical Sessions at Convention Hall—(Left to Right): Daniel B. Doherty (Cabot), Owen J. Brown, Jr., (Cabot), Charles W. Walton, Jr., (Goodyear), Donald Simonds (Cabot)

The following paper was given before the Division of Cellulose Chemistry.

The Degradation of Rayon Tire Yarn at Elevated Temperatures. The chemical and physical changes resulting from heating a regenerated-cellulose tire yarn under a variety of laboratory conditions have been studied. Either oxygen or moisture alone accelerates the degradation of the yarn and, when present together, the rate is greatly increased; this increase is greater than one would predict from a consideration of the effects produced when they are present separately. The oxycellulose formed when oxygen is present is decomposed to give by-products which further accelerate the deterioration. Both aldehyde and carboxyl groups are present in this material.

Heat aging affects various physical properties of the yarns. The moisture absorption capacity is reduced by about 40%. The X-ray diffraction pattern becomes sharper, and a partial conversion from a regenerated to a native cellulose structure takes place. Solution viscosity determinations measure the change that occurs in the degree of polymerization.

The strength of rayon tire yarn is decreased after exposure to elevated temperatures; the amount of loss is dependent upon the time, temperature, moisture, and oxygen content. The fatigue life is even more affected. The rating of nylon and cotton cords relative to rayon depends on the amount of moisture and oxygen present during the test.

These facts are correlated into a theory of the mechanism of the degradation of cellulose at elevated temperatures. R. C. Waller, K. C. Bass, and W. E. Roseveare, du Pont, Richmond, Va.

This paper was given before the Division of Physical and Inorganic Chemistry.

An Investigation of the Polymerization of Styrene with a Low-Temperature Calorimeter. During the war the principal work of the Cryogenic Laboratory of the National Bureau of Standards was connected in some way with low temperature, specific heat calorimetry, and covered various types of substances. In conjunction with specific heat measurements, measurements were made of such related properties as heats of transition, vapor pressures, and densities and expansivities in condensed states. Tables of thermodynamic functions calculated from calorimetric data were extended to high temperatures by calculation using spectroscopic data.

The usefulness of the low-temperature specific heat calorimeters was significantly extended by adapting them for measurements to +130° C.

In connection with determinations by the laboratory staff of the thermo-dynamic properties of monomer and polymer styrene, measurements were made from 20 to 100° C. of the rate of evolution of the heat of thermal polymerization of pure styrene in vacuo in a low-temperature adiabatic, specific heat calorimeter. From these calorimetric measurements and the amount of polymer formed determinations were made of the heat of polymerization and the heat of activation. The heat of polymerization forming polystyrene in solution in monomer styrene at 25° C. is 17.2 kcal. per mole of styrene unit, and the heat of activation is 21 kcl. per mole. The heat of polymerization is in close agreement with the difference in energy of two single C-C bonds and one double C=C bond, and the heat of actition with the difference in energy of a vinyl group in its normal state and in its first excited electronic (triplet) state. F. G. Brickwedde, National Bureau of Standards, Washington, D. C.

This paper was given before the Division of Industrial and Engineering Chemistry.

The Electrical Properties of Butyl Rubber. Differences in chemical structure between Butyl rubber and other elastomers, both natural and synthetic, are discussed, particularly as they affect electrical properties. Butyl rubber is a superior low-loss electrical insulating material, and because of its relatively low percentage of unsaturation, it is not readily susceptible to the action of ozone. This property makes it of outstanding interest and value in the formulation of power cable insulations which operate at elevated voltages.

Conventional types of power cable insulation are discussed and comparisons, both physical and electrical, are made between them and the newer Butyl type. These comparisons include such factors as dielectric strength, power factor, specific inductive capacitance, moisture absorption, S. I. C. change in water, corona resistance, etc. The aging properties of Butyl for insulating purposes have been found to be excellent, and since long life is a prerequisite for cable insulations, data

pertaining to aging are highlighted. The advantages in corona resistance offered by Butyl are also brought into clear focus.

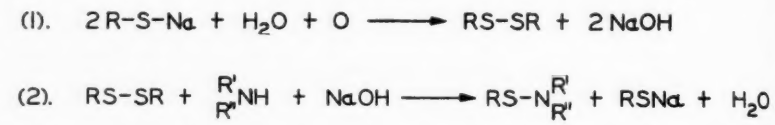
The advantages gained through the use of Butyl rubber in electrical insulations are summarized, and some prognostications are given as to its future in this field. I. C. Eaton, A. V. Roberts, and E. E. Sheldon, General Electric Co., Bridgeport, Conn.

The following two papers were given before the Division of Organic Chemistry.

The Polymerization of *p*-Chlorostyrene in the Presence of Polymethylacrylate. When *p*-chlorostyrene was polymerized in the presence of polymethylacrylate at 50° C., in the absence of catalysts, polymers were formed which contained both *p*-chlorostyrene and methyl acrylate units. Polymethylacrylate was stirred under nitrogen with four to five times its weight of *p*-chlorostyrene, and the mixture was sealed into glass tubes and allowed to polymerize at 50°. The contents of the tubes were dissolved in 1,4-dioxane, and the polymer was precipitated by pouring the solutions into methanol. The solid polymers were saponified in order to convert polyacrylate units into water-soluble poly-acrylic acid units, dialyzed to remove chloride ions, dried, powdered, and extracted with benzene until the chlorine contents reached constant values. Control experiments established the fact that, when pure poly-*p*-chlorostyrene and pure polymethylacrylate were dissolved in 1,4-dioxane and submitted to the separation procedure, the chlorine contents of the benzene-insoluble fractions were significantly less than the values obtained from polymers formed by the interaction of *p*-chlorostyrene on polymethylacrylate. Thus the presence of chlorine in the latter polymers could not be attributed to physical entanglement of poly-*p*-chlorostyrene chains with polyacrylic acid chains.

It is likely that the results of these experiments can be attributed to radical chain transfer reactions between growing poly-*p*-chlorostyrene chains and poly-methylacrylate molecules. Robert B. Carlin, University of Rochester, Rochester, N. Y., and Nancy E. Shakespeare, American Cyanamid Co., Stamford, Conn.

Thiazyl Sulfenamides. A method has been developed for the preparation of unsubstituted and N-substituted 2-thiazy sulfenamides. This method involves the oxidation with halogen oxidizing agents (chlorine, sodium hypochlorite, iodine) of alkaline solutions containing the sodium salts of 2-mercaptothiazoles together with ammonia, aliphatic, or alicyclic amines. The optimum reaction conditions for any particular preparation require a balance between the alkalinity of the solution (pH), the concentrations of the reactants, including the amount of excess amine employed, and the temperature. The method has been extended to the preparation of a series of new compounds prepared from 2-mercaptobenzothiazole and from various 2-mercapto aliphatic thiazoles with some aliphatic and alicyclic primary and secondary amines. The mechanism of the reaction probably includes the instantaneous formation of thiazyl disulfide, which then reacts with the amine to form sulfenamide and sodium thiazyl mercaptide (the starting material). The reaction with amine is the rate-controlling reaction for the process.



(1). $2\,R\text{-}S\text{-}Na + H_2O + O \longrightarrow RS\text{-}SR + 2\,NaOH$

(2). $RS\text{-}SR + \begin{matrix} R' \\ R'' \end{matrix}NH + NaOH \longrightarrow RS\text{-}N\begin{matrix} R' \\ R'' \end{matrix} + RSNa + H_2O$

These compounds decompose on standing; thiazyl disulfides are found among the products of decomposition. The stability has been shown to vary with the structure of the substituents on the nitrogen as well as with the structure of the thiazole.

Some derivatives have been obtained from these compounds with phenyl-isocyanate, acetic anhydride, and aldehydes and ketones. They react with carbon disulfide to form isothiocyanates. Edward Carr and G. E. P. Smith, Jr., Firestone Tire & Rubber Co., Akron, O.

This paper was given before the Division of Analytical and Micro Chemistry.

Determination of Rubber Hydrocarbon by a Gravimetric Rubber Tetrabromide Method. The usual method of determining rubber hydrocarbon by difference is not satisfactory for the analysis of crude rubbers and latices from sources other than *Hevea*, in which the rubber content is often low and the behavior of the non-rubber constituents not well known. A gravimetric method based on the formation of an alcohol-insoluble bromide derivative of rubber has therefore been developed for the direct estimation of rubber hydrocarbon in products obtained by the solvent extraction and pebble milling of guayule, *Kok-saghyz*, and *Cryptostegia*. The method is an extension and improvement of one used by Edison and his coworkers for the determination of rubber in native American plants.

In the improved method the rubber in benzene solution is brominated under specified conditions for one hour at room temperature. The weight of the alcohol-precipitated "tetrabromide" is converted into weight of rubber hydrocarbon by means of a factor which has been experimentally determined for each plant source by ultimate analysis of many "tetrabromide" preparations. These factors are shown to approximate the value of 0.299, demanded by theory for rubber tetrabromide, to depend slightly on the plant source, and to vary insignificantly with reasonable changes in time and temperature of bromination and concentrations of rubber and bromine in solution. Detailed procedures have been developed for the application of the method to the determination of rubber hydrocarbon in (a) organic solvent extracts of plant tissues, (b) crude rubbers, (c) aqueous liquors low in rubber content, and (d) latices and liquids of high rubber content. C. O. Willits, M. L. Swain, and C. L. Ogg, Eastern Regional Research Laboratory.

Metallic Soap for Neoprene Latex

NOW on the market is a new water-dispersible metallic soap, known as Nopco 1097. According to the manufacturer, the addition of this soap to neoprene latex compounds is proving helpful in improving water resistance and as a means of more readily incorporating the metallic soaps.

The new Nopco 1097 group consists of various metallic soaps, such as those of zinc, aluminum, calcium, lead and magnesium, blended with an emulsifier. The resulting products are, in general, water-dispersible, semi-fluid white pastes containing approximately 45% solids. The most outstanding property of this group of metallic soaps is their ability to disperse readily in water. This property opens up new fields of applications heretofore impossible owing to the water insolubility of metallic soaps. Tests conducted with the new product have also shown that the spraying of a dilute dispersion of Nopco 1097 helps prevent adhesion of rubber sheeting.

The semi-fluid white pastes, prepared with Nopco 1097, may be diluted with water to any desired concentration. The pH of a 5% dispersion averages between 7.5 and 8.0. Since the emulsifier is essentially chemically inert, the dispersion is fairly stable to dilute alkalies, but not to strong acids which react with the metallic soap.

Shrinkage Reducers

THE Brown Co. claims that the incorporation in the stock of a few per cent. of Solka-Floc is a proved and economical way of reducing shrinkage in white and colored rubber goods. Solka-Floc is the company's trade name for a line of fibrous, chemically purified wood cellulose products. Because of its fibrous nature, up to 20 parts of the material may be used as a stiffener of rubber compounds, permitting heavier loading. The line includes several grades, with a wide choice of particle size in each grade, all of which are readily available in quantity. The finer materials, such as Solka-Floc BW 200, find use in latex compounding and in the loading of foam rubber; while the longer fibered products may be dusted on to a prevulcanizate to produce a suede-like finish. The material can also be used in thermoplastic resin compounds, such as the vinyls, with retention of flexibility and considerable extension of more expensive materials. In a typical case, using a rubber stock which exhibited shrinkage of 15%, the incorporation of two parts of Solka-Floc BW 40 to 100 parts of rubber reduced shrinkage to a negligible amount, with no significant effect on other properties.

R. I. Rubber Club Hears Kavenagh

A DINNER-MEETING of the Rhode Island Rubber Club was held at the Crown Hotel, Providence, R. I., March 28, at which W. E. Kavenagh, manager of the technical division of the Goodyear Tire & Rubber Co. plant at Windsor, Vt., spoke on "German Rubber Industry." Mr. Kavenagh was a member of a technical mission that visited Germany during 1945 and his special interest was that part of the German rubber industry having to do with the manufacture of soles and heels. S. I. Strickhouser, chairman of the Club, presided and introduced the speaker. About 110 members and guests were present at this meeting.

Mr. Kavenagh, in his very interesting talk, described his experiences and difficulties in traveling and living in Germany during the course of his investigation, with special reference to the general condition of the country, the attitude of the German people and how the scientists and technicians as well as the general public were solving the problems of food and shelter. Since much of Mr. Kavenagh's traveling from place to place was done by jeep, his account of these trips added a humorous and entertaining note to the discussion.

With respect to the sole and heel industry in Germany[1], the speaker first mentioned that before the war sole leather was the principal material used in Germany for shoe bottoms; but as the war progressed and sole leather became scarce, various substitute materials were used in increasingly large amounts. The production of composition soling "plates" from Buna S reclaim base increased sixfold, and substitute leathers of various types were specified for certain types of shoe bottoms. The amount of Buna S and reclaimed permitted for use in soles and heels was definitely restricted. The development of "P" soling, an unchlorinated vinyl plastic soling material, added another large-volume substitute for sole leather. This "P" soling became increasingly popular until toward the end of the war, when scarcity of raw materials and bombed plants reduced production materially. Dr. Roser, the inventor of this new soling, claimed that its success was due primarily to the high molecular weight of the vinyl plastic—between 200,000 and 270,000. Mr. Kavenagh stated that the results apparently justified these claims.

In general, German soles are harder, cold flow properties are lower, and stitch-tear resistance is relatively high. Ago cement was used in most cases in attaching synthetic rubber soles. It is pertinent to note that German scientists claimed superiority for their Buna S over our GR-S, mostly because of the higher molecular weight of the German product, Mr. Kavenagh said. He added that it was his understanding that recent rechecks in this country of German Buna S with German compounding materials seem to substantiate the German scientists' claims. It was pointed out that the analogy between the higher molecular weight of German plastic soling material and German Buna S was interesting and significant. Although it is realized that the tougher German Buna S would not be adaptable to high-speed American production, it was reported last summer in Germany, but not confirmed, that the German scientists were close to overcoming production difficulties inherent in German Buna S, Mr. Kavenagh added.

German compounding ingredients were similar in many cases to those used in this country, but a new-type pigment, Tonerdegel, "TEG", an aluminum oxide gel, seemed particularly effective as a reenforcing pigment in no-mark soles and heels. Good abrasion and wear performance, high stich-tear tests, and firm, boardy, leather-like properties were developed in soling materials using TEG as the basic pigment. Reference was also made to another pigment, White Russ CK3 — "White Carbon Black." This pigment, made from silicon chloride, was reported by the Germans as capable of developing properties equal to carbon black and is now being investigated by American technicians.

Mr. Kavenagh reported that there have been no new developments of special note in the field of adhesives for shoe manufacture. As natural rubber became scarce, adhesives were made from polyvinyl acetate and polyisobutylene. However some of the more recent developments with Desmodors (isocyanates) may provide outstanding adhesives for shoe manufacture.

Except for the plant of the Continental Rubber Co. none of the various plants visited were comparable with the same-type plants in the United States from a production viewpoint. More tonnage was required per ton output, and progress toward mechanization was quite limited. Similar to other investigators, Mr. Kavenagh was impressed with the equipment and the personnel of the I. G. Farben Central Rubber Laboratories at Leverkusen. He also pointed out that every rubber factory visited, no matter how small, was adequately staffed with laboratory personnel.

Dr. Strickhouser during a short business meeting stated that the executive committee of the Club had decided to recommend that, in accordance with the new by-laws of the Division of Rubber Chemistry, A. C. S., the Rhode Island Rubber Club should seek sponsorship by the Division of Rubber Chemistry and thus be able to have representation on the board of directors of the Division. He asked for a motion to that effect from the members, and such a motion was made, seconded, and approved by voice vote. Dr. Strickhouser also stated that as a matter of policy, future meetings of the Club would be held on Thursday instead of Friday evenings, if agreeable to the membership, and this new policy was approved.

[1] For a complete report see Office of Publication Board Report, PB 1577, "The German Rubber Footwear Industry. The German Sole and Heel Industry." H. W. Martin and W. E. Kavenagh.

SAE Aeronautic Meeting

PRESENTING to aeronautical engineers the first opportunity since the war for unrestricted technical review of wartime developments in commercial, military, and private flying, the national aeronautic meeting Society of Automotive Engineers, Inc., was held at the Hotel New Yorker, New York, N. Y., April 3 to 5. Featuring displays of fog dispersal equipment and jet engines, the meeting included sessions on the various factors entering into aeronautical engineering, such as general aircraft design, power plants, transport, metals, aerodynamics, and others.

A feature of the aircraft session on April 3 was a paper on "Pneumatic Tires for Modern Airplanes," given by R. D. Evans, manager of the tire design research section of the Goodyear Tire & Rubber Co. Approximately 55 members and guests heard Mr. Evans describe the developments in aircraft tire design of the past few years, showing significant increases in the ratios of load rating to tire weight and load rating to envelope-volume and in inflation pressure. Regarding materials, Mr. Evans pointed out that the greatest shortcoming of GR-S as a tire material, that of heat hysteresis, has not appreciably impaired its service in airplane tires. Because of the higher gravity of GR-S, airplane tires of this synthetic are heavier by approximately 5% than natural rubber tires. The important story in airplane tire development during the past decade lies in the types of cord used, rayon and nylon. Slides were shown to illustrate the superiority of these filaments to cotton cord in performance, and the speaker stated that further developments in the use of nylon cord are being made that will make it the outstanding structural component of airplane tires. Some data on the use of fine, high-tensile steel wire as the ply material for airplane tires were presented, but results to date with this material are not too promising. The speaker also discussed steering characteristics and tire sizes and proportions. He pointed out that, although still larger tires can be made if required, it is believed that the optimum efficiency for airplane tires is somewhere in the range of 40 to 60 inches' overall diameter.

High Purity Heptane

THE availability at comparatively low prices in drum or tank-car quantities of exceptional high purity normal heptane has been announced by Phillips Petroleum Co., Bartlesville, Okla. Preliminary examination of production stream samples indicates the purity of the normal heptane to be over 99 mol per cent. and the material to have a freezing point of −90.76° C., density at 20° C., of 0.6839 gms./ml., and a refractive index of 1.3877. The traces of other hydrocarbons in this material are considered to be chiefly 3-methylhexane or methylcyclohexane or both. The normal heptane is segregated from straight run and natural gasolines by elaborate distillation procedures. An outgrowth of a prior development of a less pure grade for solvent purposes, the high purity heptane has interesting possibilities for more exacting solvent applications because of its boiling point of 209° F. Besides the chemical possibilities of this material may be of importance.

Street and Sebrell Talk before A. I. C.

A MEETING of the New York Chapter of the American Institute of Chemists, held on March 22 at the Building & Trades Club, 2 Park Ave., New York, N. Y., was featured by talks by J. N. Street, assistant director of laboratories of the Firestone Tire & Rubber Co., and L. B. Sebrell, director of research of the Goodyear Tire & Rubber Co. Chairman A. Lloyd Taylor presided and introduced the speakers.

Street on Synthetic Rubber

Dr. Street, speaking on the subject of "Synthetic Rubber—What Now?", forecast a delay until 1948 of the critical battle between synthetic and natural rubber and predicted that improvements in synthetic rubber and its processing may simplify this nation's decision. If comparable quality is attained, only cost and political factors will remain to determine how much natural rubber will be imported into the United States and how much synthetic rubber will be produced in government and industry plants, it was suggested.

The current opinion expressed by Dr. Street in comparing quality of the synthetic and natural products was: "The synthetic tire of today will deliver as good or better trouble-free mileage as the prewar natural rubber tire at a cost comparable to that of the natural rubber tire in passenger sizes. Butyl rubber has good possibilities of developing preference over natural rubber for use in tubes—particularly due to outstandingly better air retention. The use of neoprene and also the Buna N and 'Thiokol' type polymers will expand, but will, for the time being at least, remain predominantly specialty rubbers."

Types of synthetic rubber to be used, in the opinion of this speaker, will be determined strictly in accordance with their economic values.

"Neoprene and Butyl, because of properties differing in certain advantageous ways from natural rubber, will be chosen for some products even though the cost be higher. In the softer, more readily deformable mechanical goods products, natural rubber will be used as soon as available. If GR-S is available at a cost below that of natural, it will probably be used to a large extent. If natural were available at a lower price than GR-S, then it would be used exclusively."

In summing up on the use of synthetic rubber in tires, Dr. Street reported that "on passenger tires, the present GR-S will give service sufficiently close to that of natural rubber so that the car driver cannot determine the difference. GR-S is slightly inferior on wear, on maximum safe speed, and skid resistance on snow and ice . . . it has an advantage on skid-resistance on wet roads and on radial cracking . . . price will be the definite factor in determining whether passenger tires will be made of synthetic or natural rubber."

In the case of heavy-duty truck and bus tires, synthetic rubber can assure satisfactory service for 60% of heavy vehicles, it was said.

During his talk Dr. Street emphasized the desirability in the interest of national welfare of continuing basic research on synthetic rubber.

"I happen to be one of the group that harbors some qualms as to the ability of governments to formulate a continuing policy to prevent future wars. On this basis, a broad program for development of elastic polymers must be formulated in a manner that will be effective not only from a theoretical, but from a practical standpoint," he concluded.

Sebrell on Plastics

The subject of Dr. Sebrell's paper was "Plastics as Materials of Construction," in which he pointed out that to cover the entire field of plastics in one evening was too great a task, but that he would select certain classes as representative of the uses to which plastics may be applied and would also explain the properties which may be obtained in these various applications. After showing a chart of the general classification of plastics, Dr. Sebrell indicated that he would limit his discussion to vinyl plastics for coatings, extrusion, and molding; processes for post-forming, laminating, and sandwich-type constructions; clear glasses; and synthetic resins from rubber.

Under vinyl resins for coatings, the application of the vinyl materials in the form of thin self-supporting films was mentioned as an important use of this type of material. The extrusion of Saran in the form of this transparent sheeting which has a fairly low moisture-vapor transfer and its comparison with the Goodyear company's Pliofilm were referred to.

In connection with laminated plastics, Dr. Sebrell gave a table of properties of these materials as compared with aluminum and steel. Two sizable difficulties were stressed in connection with laminated plastics, the decomposition of the rubber bag used in forming from the fumes from the resins, and the lack of a good parting medium which may be used between the molding material and the rubber bag. In discussing sandwich-type construction, the superiority of balsa wood as a core material was emphasized.

Dr. Sebrell concluded his discussion with comment on the Goodyear company's Pliolites S-3 and S-5, special resins made from synthetic rubber for use in the manufacture of cement paints, coatings for corrosion resistance, interior finishes, etc.

Institute's Annual Meeting

The Institute will hold its twenty-third annual meeting May 17 and 18 at the Biltmore Hotel, New York. The annual meeting will be held on May 17, following a meeting and luncheon of the Institute's national council. The meeting will include an address by the president, Gustav Egloff, and a symposium on "The Professional Status of the Chemist." Speakers contributing to the symposium will be Raymond E. Kirk, head of the department of Chemistry and dean of the Graduate School of the Polytechnic Institute of Brooklyn; Foster Dee Snell, president of Foster D. Snell, Inc.; John M. Weiss, chemical engineer of John M. Weiss & Co.; and John D. Coleman, Frigidaire division of General Motors Co. and chairman of the Ohio Chemists' Committee on Professional Practice. After the general meeting, a business meeting will be held, featuring the election of officers and committee reports.

At the evening session on May 17 the gold medal of the Institute will be presented by Dr. Egloff to Robert Price Russell, president of Standard Oil Development Co. Maj. Gen. Alden H. Waitt, chief of the Chemical Warfare Service, and Warren K. Lewis, professor of chemical engineering at Massachusetts Institute of Technology, will speak on Mr. Russell's achievements, and there will be an acceptance address by the medalist.

On May 18 there will be an inspection of the Standard Oil Development Co. laboratories and plant at Elizabeth, N. J.

Yohe Talks on Synthetic Latex

MORE than 250 attended a dinner-meeting of The Los Angeles Rubber Group, Inc., at the Mayfair Hotel, Los Angeles, Calif., April 2, as guests of officials of The B. F. Goodrich Co. Principal speakers were R. V. Yohe, vice president of American Anode, Inc., and William Fowler, professor of physics at the California Institute of Technology. T. W. Perdriau, Goodrich factory plant manager, and Lee L. Horchitz, past chairman of the Group and manager of Goodrich's industrial products division, were in charge of the meeting. C. Miles Reinke, chairman of the Group, presided.

Dr. Yohe predicted new developments in reenforcing latex, possibly within the next few months. He pointed out that vastly increased uses for synthetic latices, as demonstrated in products from various companies, provide the rubber industry with an expanding market. The 15 million pounds of natural latex expected to enter the country this year will be only a tiny fraction of the amount needed, and the demand for synthetic latices will therefore continue to be heavy. The costs of shipping and stabilizing the crude latex are such as to make synthetic latices comparable in price. The speaker stated that only a few products formerly made of natural latex cannot at present be made of synthetics, but that work on this problem is expected to yield satisfactory results.

Dr. Fowler, who served with the National Defense Research Council during the war in developing the rocket weapons and the atomic bomb, gave a talk on the bomb, illustrated by means of slides. He then presented motion pictures on rockets and their use as offensive weapons.

Dr. Yohe was available as a speaker because of his presence in Los Angeles to confer with architects on plans to erect a branch plant for the company, on a site allocated by Goodrich, of which American Anode is a subsidiary.

Door prizes donated by Goodrich were distributed, with W. L. Subith winning the main award, a Goodrich synthetic rubber tire.

The Los Angeles Rubber Group held its spring Mardi Gras golf tournament on April 27 at the Rio Hondo Country Club, with Jack Ballagh as chairman.

Carbon Black Developments

W. R. SMITH, chief research chemist for Godfrey L. Cabot, Inc., Boston, Mass., spoke on "Recent Advances in Carbon Black Technology" before a joint meeting of the Buffalo Rubber Group and the Western New York section of the American Chemical Society on April 16. After discussing methods of manufacture and the general nature of carbon black, Dr. Smith pointed out that the rubber reenforcing properties of the black depend to a large extent upon particle size.

The electron microscope made possible accurate determination of particle size and established the dependence of tensile strength, resilience and hysteresis of rubber stocks on the diameter of the reenforcing carbon black particles. Other rubber properties, notably modulus, show no clear-cut dependence upon particle size, and it has been suggested that these properties are associated with the activity of the carbon black surface. Up to the present, said Dr. Smith, no quantitative evaluation of the nature or intensity of these surface forces has been available.

An investigation into these forces is being sponsored by Cabot. The method employed in the investigation involves measurement by precise calorimetry of the heat evolved when various gaseous molecules are adsorbed on the carbon surface. Preliminary results, using nitrogen as the adsorbate, indicate that a reenforcing carbon black surface is not uniform, but is characterized by sites of high activity. Excessive heat treatment of the carbon destroys these highly active sites and drastically reduces the reenforcing properties of the black. Further work, using various unsaturated hydrocarbons as adsorbates, is in progress in the Cabot laboratories in an attempt to duplicate more closely the system carbon black and rubber.

Engineering Education Discussed

A ROUND-TABLE discussion on the subject, "Is the young graduate engineer prepared to take his place in industry?" was the feature of a dinner-meeting of the Gates Technical Club, held March 7 at the Albany Hotel, Denver, Colo. Attendance at the meeting included 112 members and five guests. Members of the panel were Drace Kutnewsky, a young engineer, and Ernie Nassimbene, an experienced engineer. Production and supervision were represented by Frank Bosley, marketing by Lou Carrol, and top management by G. W. Liljestrom. The educational side was presented by C. M. Knudsen, dean of the University of Denver, C. A. Borgman, of the University of Colorado, and J. R. Morgan, dean of the Colorado School of Mines. The discussion, under the chairmanship of K. G. Custer, brought out the point that although academic preparation was often incomplete, unintegrated and narrow in viewpoint, industry also has an important role in the training of engineers. It was emphasized that the first few years of an engineer's career depend equally on his educational background, the assistance provided by industry in orienting and further training him, and on his individual efforts. An understanding and realization of these factors are necessary for facilitating the transition from the university to industry.

OPB Asks Help from Industry

THE Office of the Publication Board of the United States Department of Commerce, Washington, D. C., is asking for cooperation from American industry in connection with its joint task with the War Department of selecting and microfilming in Germany of data that may be valuable to American science and industry. John C. Green, executive secretary of the Publication Board, states that it is impossible for any government agency to determine what items in the enormous mass of material may be of value to some American business or research group and that his organization needs help.

This combing of German technical documents is the second phase of work begun by the Technical Industrial Intelligence Committees. TIIC coordinated the work of teams of experts drawn from industry who made surveys of each industrial field in Germany immediately after fighting ceased. These experts, loaned by industry for a few weeks or months, were usually unable to make a detailed study of the documents uncovered by their investigations.

The OPB wants suggestions from industries and scientific groups as to what specific information should be sought and where the documents might be found. There is also a need for qualified technicians in a number of industrial fields to supervise the work of searching German files. A knowledge of technical German is essential, and appointments are made subject to Civil Service approval for a minimum of six months.

In addition the OPB states that any industry or scientific group interested in specific German industrial methods and able to assign personnel to visit Germany should get in touch with that agency. If the project appears to be of probable value to American industry, OPB will make the necessary arrangements.

Latex Concentration with Soap

TO THE varied uses of soap in latex treating and compounding may be added its employment in a new method for concentrating latex. A major step in such a process[1] consists of adding to normal latex a carefully determined amount of soap and the sulfuric acid ester of octadecyl lactate. Latex treated with these materials is then passed through a centrifuge adjusted to produce a high concentration. Without clogging the apparatus, it becomes possible by this method to produce a cream of better mechanical stability than that which could be obtained at the same centrifuge adjustment without the soap and oleyl ester.

[1] U. S. Patent No. 2,371,560 to G. J. van der Bie, now vested in the Alien Property Custodian.

Connecticut Group Elects

THE results of balloting for regular officers of the Connecticut Rubber Group were announced March 29. The successful candidates, who assumed office at a meeting of the Group's executive committee on April 5, are: chairman, William J. O'Brien, Jr., Seamless Rubber Co.; vice chairman, Raymond H. Dudley, Whitney Blake Co.; secretary, Alfred J. Jennings, E. I. du Pont de Nemours & Co., Inc.; treasurer, Edmond J. Butler, General Electric Co.; directors, Fred W. Holbrook, Naugatuck Chemical Division, United States Rubber Co.; George D'Olier, Raybestos-Manhattan, Inc.; Stuart M. Boyd, Naugatuck footwear division, U. S. Rubber; and Roger C. Bascom, B. F. Goodrich Chemical Co.

The group now has 147 paid members. Future plans call for emphasis of the educational side of meetings, with elimination of dinner and accompanying social activities preliminary to meetings. Particular attention is to be paid toward bringing the benefits of membership to the younger technical personnel in the Connecticut area who are unable to attend the sessions of the New York Rubber Group. In addition membership is also open to non-technical personnel engaged in methods, production, or purchasing work in the rubber field. Present plans call for three meetings a year plus a summer outing. These meetings will be arranged to avoid conflict with those of the New York Group.

Silicone Antifoaming Agent

DC ANTIFOAM, a Silicone product, has recently been developed and made commercially available by the Dow Corning Corp., Midland, Mich. Tests have proved its effectiveness in eliminating foaming problems as difficult to control as those which occur during the steam distillation or vacuum concentration of various aqueous solutions and emulsions, including synthetic rubber latices. The new material is a translucent, colorless, tasteless, viscous compound which is chemically inert and non-volatile and has a slight, but not unpleasant odor. It is soluble in such solvents as benzene, carbon tetrachloride, toluene, and V. M. & P. naphtha. It may be used as supplied, thinned with one of the above solvents, or prepared as an emulsion.

Tests performed during the vacuum distillation of various rubber latices which are abnormally hard to control showed that foaming was effectively inhibited by five parts of DC Antifoam A per 1,000 parts of latex. Foaming during steam distillation of emulsions of butadiene-styrene copolymers was eliminated by a combination of one part of DC Antifoam A and 12 parts of oleic acid in a concentration of 80 parts per million. The effectiveness of DC Antifoam A in different latices is unpredictable. It has been found to be very effective in some types of latices and only slightly effective in others. Since its effectiveness can be determined only by specific application, the company is supplying samples of the material for test purposes.

Additional Experimental GR-S and GR-S Latices

ADDITIONS to the list of experimental GR-S dry polymers and GR-S latices available for distribution to rubber goods manufacturers from the Office of Rubber Reserve, RFC, under the conditions outlined in our November, 1945, issue, page 237, have been received and are listed below:

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description	Special Characteristics
X-292-GR-S	U. S. Rubber-Institute	3/28/46	Masterbatch containing 100 parts Buca A clay and 100 parts of a GR-S type polymer made with sodium sulfide shortstopper, 40 Mooney viscosity, 1.5 parts discoloring antioxidant.	Clay masterbatches are reported to have superior processing and handling characteristics. For use in stocks requiring this type of material.
X-295-GR-S	Goodyear-Torrance	4/11/46	GR-S-38 alum coagulated.	Same purpose use as GR-S-38.
X-296-GR-S	General-Baytown	3/29/46	Masterbatch containing 50 parts EPC black and 100 parts of a GR-S-10 type polymer, made at sightly higher temperature to normal conversion, with modifier adjusted to give Mooney viscosity of the unpigmented polymer of 44± 5.	Carbon black masterbatches are reported to show superior processing and handling characteristics. For use in stocks requiring this type of black.
X-297-GR-S	General-Baytown	3/29/46	Similar to X-296 GR-S, varying the soap content slightly and adjusting the modifier to give a Mooney viscosity of 38± 5.	Because of the lower Mooney, this polymer should show superior processing and handling characteristics over X-296.
X-298-GR-S	General-Baytown	4/9/46	GR-S Black I made at a slightly higher temperature, with a Mooney of the unpigmented polymer adjusted to 38± 5.	This X-Number polymer should have syperior processing characteristics over GR-S Black I owing to the lower Mooney.
X-299-GR-S	U. S. Rubber-Naugatuck	3/26/46	GR-S latex made with non-hydrogenated soap, carried to a slightly higher conversion, and shortstopped with hydroquinone.	Evaluation of this type of polymer indicates it to be more suitable than Type II latex for use in foam sponge.
X-302-GR-S	Goodrich-Port Neches	4/1/46	GR-S-10 made using slightly different rosin acid soap	Same purpose use as GR-S-10.
X-303-GR-S Latex	U. S. Rubber-Naugatuck	4/10/46	GR-S latex similar to X-299 latex except that the dry Mooney range is much lower, from 20-35.	Possible use in adhesives and general-purpose use.

Foreign Trade Opportunities

The United States Department of Commerce, in cooperation with the American Foreign Service, has resumed an old, established aid to foreign trades—the dissemination of special opportunities to buy or sell abroad. This service is one of a number to overseas traders discontinued with the declaration of war in December, 1941.

The firms and individuals listed below have recently expressed their interest in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the Department of Commerce, or through its field offices, for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

Etablissements Caro & Lambet, 1 Place de la Passerelle, Thoux, Belgium: sporting goods, particularly footballs, tennis balls, bladders.

Access-Automoto S. A., 54 Avenue Louis Lepoutre, Brussels, Belgium: automobile accessories.

Etablissements Emile Grisay & Fils, 106 Rue Ferdinand Nicola, Seraing, Belgium: industrial rubber goods.

Etablissements "Tecomin", 3 Rue Boduognat, Brussels, Belgium: rubber goods including novelties, druggists' sundries, toys, gloves, bathing hats and shoes.

Manuel Numes, Rua do Sol a Chelas 12-B, representing Numes & Munes, Libson, Portugal: electric cables, industrial machinery, chemicals.

Nelson McGregor, of J. A. McGregor & Son (Pty.) Ltd., Johannesburg, South Africa: packaging materials and containers.

David Kay, representing Keene & Co., P. O. Box 2883, Johannesburg, South Africa: plastic finished merchandise for household and building purposes, cotton and rayon fabrics, electrical household appliances, notions.

Francisco Franendorf, Av. Counselheiro Rodriguez Alves 392, Sao Paulo, Brazil, representing S. A. Fabricas Orion, 9 Rua Joaquim Carlos, Sao Paulo: machinery for mechanical rubber goods and bicycle tires.

Josef Nagler, manager, AB. Karnag, 22 Katarinavagen, Stockholm, Sweden: artificial leather for automobiles and buses, automobile accessories, tire repair equipment, gaskets.

Arthur F. Rucker-Embden, managing director, AB. Svenska Generalagenturen, 13 Drottninggatan, Stockholm, Sweden: corsets, elastic webbing, bathing suits.

Societa "Etelia", 32 Via Campofiore, Florence, Italy: toluol, xylol, damar gum, Gilsonite.

Philip Sten Horwitz, managing director, Gustaf Horwitz AB., 5-B Strandvagen, Stockholm, Sweden: corsets, brassieres, and allied lines.

Ludvig E. Matthias, representing Handels AB. Ultramare, 4 Arsenalsgatan, Stockholm, Sweden: industrial chemicals.

Société Cooperative Cobelimex, 37 Rue Henri Maus, Brussels, Belgium: toys.

Etablissements Landuyt-Wuyts, Eecloo, Belgium: rubber V-belts and flat rubber and woven belts for the textile industry.

Paul Louis, 49 Rue G. J. Martin, Brussels, Belgium: druggists' sundries and hospital supplies including nipples, gloves, irrigators, bandages, belts, stockings.

C. P. Froehlich, purchasing manager, Tia, S.A., Calle 18, 5-95, Bogota, Colombia: merchandise for department stores.

Ricardo Cantu Leal of Acumuladores L. T. H., Zaragoza y Aramberri, Monterrey, N. L., Mexico: batteries and parts and material for the manufacture of batteries.

Dirección de Administración de Policia, Ministerio de Gobierno y Policia, Plaza Italia, Lima, Peru: bicycle tires and tubes.

Antonia Preve, representing Edmundo J. Angendscheit, Av. 18 de Julio 985, Montevideo: merchandise for department stores.

Joseph A. Sarkis, of Joseph A. Sarkis & Co., Rue Trablous, Beirut, Lebanon: electric household appliances, refrigerators, automotive products, radio sets and accessories.

J. G. Abadjis, representing Hellenic Industry for Plastics, 40 Egeos St., Athens, Greece: plastic molding materials, thermoplastic injection molding machinery, chemicals for the rubber industry.

Etablissements Leon Bolle, 43 Rue de la Regence, Charleroi, Belgium: valves, belts, brake lining.

Juan B. Protto, representing Protto Hermanos, 2330 Gobernador Ugarte, Llavallol, Province of Buenos Aires, Argentina: raw material for tires and machinery.

Stuart Arthur Burmeister, representing Robert Bryce & Co. Pty. Ltd., 526-32 Little Bourke St., Melbourne, Victoria, Australia: industrial chemicals, allied raw materials and chemicals.

Tito Mascioli, representing Auto Viacao Jabaquera S. A., Rua Conselheiro Crispiniano 154, Sao Paulo, Brazil: automobile accessories.

F. Rowet Dupont, 116 Chaussee de Charleroi, Gilly, Belgium: work gloves including those of rubber.

Firma J. Heeneman, Jr., 16 Sweelinckplein, The Hague, Netherlands: surgical rubber goods including gloves, garden hose, and pneumatic tires and inner tubes.

Overseas Business Couriers S. A. (Pty.) Ltd., Anglo-African House, Smith St., (P. O. Box 1337), Durban, South Africa: rubber mat-making machines.

L. & A. D'Haeyere, 11 Rue des Chartreux, Brussels, Belgium: pyroxylin and rubber coated fabrics, plastics, synthetic rubber.

Etablissements Constant Chabot, 26 Rue Beeckman, Liege, Belgium: rubber conveyers and transmission belts for coal mines, hose.

Etablissements Cretur, 13 Rue de l'Eglise, Frameries, Belgium: rubber hospital goods, rubberized clothing, Lastex goods.

Etablissements E. Paturiaux S. A., 14-16 Rue des Bogards, Brussels, Belgium: combs, notions, elastic, dress shields, rubber aprons.

Etablissements Henri Unzel, 145 Chaussee de Gand, Brussels, Belgium: erasers.

Carrosserie Jonckheere, Beveren-Roulers, Belgium: bus seats, rubber cushions, artificial leather.

(Continued on page 264)

CALENDAR

May 3. New York Rubber Group. Hotel McAlpin, New York, N. Y.

May 7. Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.

May 17. Detroit Rubber & Plastics Group, Inc. Detroit Leland Hotel, Detroit, Mich.

May 24. Chicago Rubber Group. Hotel Morrison, Chicago, Ill.

May 31-June 2. Golden Jubilee of Automotive Industry. Detroit, Mich.

June 4. Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.

June 17-20. American Society of Mechanical Engineers. Semi-Annual Meeting. Detroit, Mich.

June 24-26. Chemical Institute of Canada. Annual Conference. Royal York Hotel, Toronto, Ont., Canada.

June 24-28. American Society for Testing Materials. Annual Meeting and Seventh Exhibit of Testing Apparatus and Related Equipment. Hotel Statler, Buffalo, N. Y.

Sept. 9-13. American Chemical Society. Chicago, Ill.

Oct. 7-11. National Safety Congress and Exposition. Chicago, Ill.

Plastics Technology

Flexible Coatings and Adhesives[1]

C. W. Patton[2]

IN RECENT years flexible coatings and adhesives based on the vinyl chloride-acetate resins have become highly regarded by the industry for their ability to fulfill many of the unusual and exacting requirements that more conventional coatings often cannot meet. These copolymer based coatings have a high degree of flexural strength and abrasion resistance. They are unaffected by mineral acids, alkalis, alcohol, and water. They have suitable adhesion to most fabrics, particularly when subjected to heat upon drying. Of prime importance is the fact that they have sufficient solubility in most ketones and may be readily plasticized to any degree of flexibility with the aid of easily obtainable plasticizers.

It would be well to mention that the term adhesive has been included in this discussion because in many cases the flexible material that normally would be considered a coating is utilized both as a waterproof barrier and an adhesive for laminating to fabrics. These flexible coatings or adhesives, in general, are applied by either of two methods: namely, by a hot, solvent-free, calendering operation, or in a solution formed at room temperature, which involves the use of volatile liquids.

New Vinyl Resin Compounds for Coating

The application of the compounds involving volatile materials is carried out by processes familiar to most, if not all, of you: namely, by spreader coating and roller coating. Before describing some of the newer materials involved in the production of flexible coatings and adhesives, it would be of interest to review the conventionel processes employed in handling these materials. In this way a clearer picture of the advantages and opportunities offered by recent developments will be obtained. Processes employed over the past few years have involved compounding appropriate vinyl chloride-acetate resin, pigments, fillers, stabilizers, plasticizers, and solvents to form a mix of high viscosity suitable for spreader or roller coating. In its simplest form this compounding consisted of preparing a dispersion of the pigments, stabilizers, and fillers in a liquid plasticizer such as "Flexol" Plasticizer DOP, or tricresyl phosphate, then adding the proper amounts of this mix to a previously prepared solution of the appropriate vinyl chloride-acetate resin in solvents such as methyl ethyl ketone at room or elevated temperatures, or mixtures of methyl ethyl ketone and cyclohexanone; the choice of solvent depends upon the solubility characteristics of the vinyl chloride-acetate resin involved.

The resins of this type which have relatively high vinyl chloride content and molecular weights in the neighborhood of 130,000 in contrast to those of, say, 90% vinyl chloride content and average molecular weight in the range of 75,000 produce the most desirable and useful properties. They can be relatively highly plasticized at room temperature to give good flexibility, to retain this flexibility at lower temperatures, and to exhibit good resistance to surface marring at elevated temperatures. They also have greater tensile srength, high abrasion resistance, and greater resistance to failure on continued flexing.

As is often the case, the materials which do the best job are more difficult to handle. For example, the group of vinyl chloride-acetate resins containing 90% vinyl chloride and with a molecular weight of 75,000 are readily soluble in acetone and methyl ethyl ketone at room temperatures. The higher vinyl chloride and molecular weight group mentioned necessitates the use of methyl ethyl ketone at elevated temperatures, preferably in pressure vessels so as to decrease evaporation losses, or mesityl oxide, or mixtures of methyl ethyl ketone and cylcohexanone.

Possibly the most economical spreader coating mixture involving this latter type of resin is that made with hot methyl ethyl ketone wherein about two pounds of solvent are required for every pound of dry coating compound involved. Assuming methyl ethyl ketone prices to be in the range of 7¢ to 10¢ a pound, this means that about 14¢ to 20¢ worth of solvents are lost (unless solvent recovery is employed) per pound of dry coating deposited, and on a four-ounce per yard dry coating this loss will amount to ¼ of that per yard, or about 3½¢ to 5¢ per square yard. It is worth while noting, however, that after a number of years of research and development work a new group of vinyl chloride-acetate resins of the high vinyl chloride, high molecular weight type are now commercially available. In some instances they completely eliminate the need of volatile solvents and in other cases greatly decrease the amounts and cost of volatile solvents involved.

These resins are available as dry white powders. The particles which can be seen with the naked eye are, in reality, agglomerates composed of thousands, if not millions, of sub-microscopic resin particles. The ultimate particles in these agglomerates range from one micron to considerably less than one micron in size. One of these resins can be utilized simply by dispersing it in plasticizer together with appropriate fillers, pigments, and stabilizers on a three-roll mill to form a paste.

Plastisols

This paste, for which the term "plastisol" has been coined, is a colloidal dispersion of resin and not a solution as we ordinarily think of such. When this paste is applied to various surfaces and heated to approximately 350° F. for an instant, the plasticizer then becomes a very active solvent and immediately dissolves the resin particles to form a homogeneous composition which, upon cooling to room temperature, results in a tough, rubbery film. Since no volatile ingredients are present, and since it is relatively fluid, this material can be used in low-pressure molding work.

Obviously, wherever coatings of this type are desired, this material offers considerable economies throgh elimination of volatile solvents and increased speed of production. The speed of production is increased because no solvents are present to necessitate a drying schedule, and the absence of solvents also means that heavier coats can be applied, and the fluxing or vulcanizing time is merely time required to get the deposited material to a temperature of approximately 350° F. No appreciable time is required to complete the fluxing once the required temperature has been attained.

Organosols

In cases where it is desirable to have a final coating composition containing relatively small amounts of plasticizer, it may be necessary to use small percentages of volatile carriers to complement the plasticizer present so as thoroughly to wet the resin and produce a sufficiently fluid mix to be applied readily. The term "organosol" has been applied to this type of compound referring to a colloidal dispersion in an organic liquid.

A resin having slightly different characteristics is also employed. In handling these mixtures containing small amounts of volatile organic liquids, it is possible to charge all the ingredients to the mix: namely, the resin, pigments, plasticizer, and volatile liquids. These are placed in a pebble or steel ball mill and effect dispersion by grinding for 18 to 36 hours. The actual grinding time depends upon the formulation involved and the ratio of the charge to amount of steel balls or pebbles present in the mill. The amount of volatile liquids necessary, in general, is relatively small, ranging from 15 to 30% of the total composition. Inexpensive blends of aliphatic

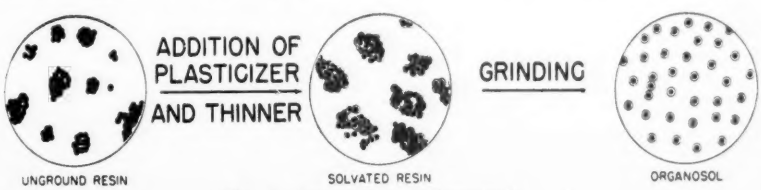


Fig. 1. Preparation of Organosols

[1] Presented before the Boston Rubber Group, Mar. 8, 1946.

[2] Manager, coating and adhesives division, thermoplastics department, Bakelite Corp., New York, N. Y.

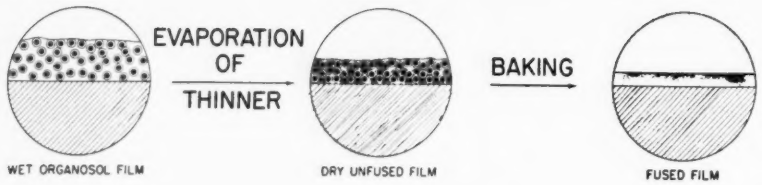


Fig. 2. Fusion of Organosols

and aromatic hydrocarbons are suitable. Blends of certain solvents, such as methyl Cellosolve* and diisobutyl ketone, with aromatic hydrocarbons are also suitable. These materials permit a relatively wide range in composition of the liquid mixture, and in addition the latter material lowers the temperature required for fluxing from 350° F. to approximately 320° F. A summary of the organosol materials and formulation is shown in Figures 1, 2, and 3.

Figure 1 depicts the addition of plasticizer and thinner to the unground resin and the formation of the organosol from the solvated resin. In Figure 2 is shown a schematic diagram for the spread wet organosol film and its transition to a finished fused film by evaporation of thinner and heating or baking. The effect of thinner balance on organosols and their resultant viscosities is shown in Figure 3.

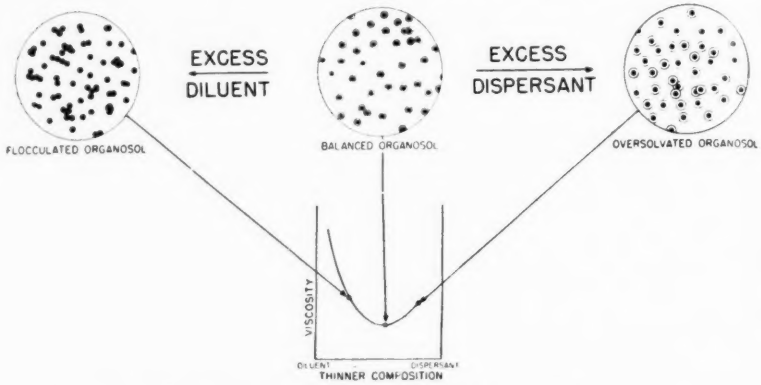


Fig. 3. Effect of Thinner Balance on Organosols

Other Applications and End Product Properties of Vinyl Resin Coatings

These dispersion resins cannot only be compounded into flexible coating materials for cloth and paper, but can also be used for the production of articles by dipping, such as gloves. These resins can also be used for casting flexible plastic films. In addition, by the use of proper primate coats, they can be used for various metal coating applications.

Wartime applications have greatly increased the use of these flexible and versatile coatings in the textile industry, but their full value is difficult to determine. It is certain that the day of the coated fabric that is heavy and stiff or spongy and tacky is past. Its place is already being taken by a fabric as soft and pliable after coating as before. These new coatings add little weight to the product and are able to stand a great deal of handling before waterproofness is impaired.

Chemical and abrasion resistance, light weight, full range of colors are among the properties easily envisioned in these modern coatings. Combinations of vinyl chloride-acetate coatings and textiles are taking an important part in the development of new and better products for our now peaceful world.

* Registered trademark of a unit of Union Carbide Carbon Corp.

Styraloy—A New Thermoplastic[1]

STYRALOY is the trade name for a series of modified polystyrene thermoplastic resins developed by the Dow Chemical Co., Midland, Mich., which possess some of the characteristics of both rigid thermoplastics and rubbers. Styraloy combines low-temperature flexibility, high-temperature flow resistance, electrical properties approaching those of polystyrene, unexcelled corona resistance at elevated temperatures, and the fabrication versatility of the thermoplastics.

The first of this series, Styraloy 22, was developed as a cable sheathing for military applications. Now available are several associated compositions which bridge the gap between the rubbers and the rigid thermoplastics. The series is composed of pure hydrocarbon materials of low specific gravity, completely free of plasticizer, but containing a small amount of antioxidant. The molding powder is of gray to blue-gray color; while fabricated articles are dark blue. A limited range of opaque colors is gradually being developed.

Coupled with excellent resistance to corona discharge are the other electrical properties of this new plastic which definitely place it in the field of high dielectric strength, low capacitance, low loss insulating materials. In spite of the relatively low heat distortion temperature by A.S.T.M. method, these resins show unusual performance at higher temperatures. Styraloy 22 shows good chemical resistance, but is not recommended for exposure to strong solvents such as acetone, toluene, carbon tetrachloride, or ethyl acetate. It has high abrasion resistance and moderate moisture absorption properties. Detailed characteristics are given in the accompanying table of properties.

Styraloy can be cemented to itself or similar plastics; solvent or adhesive bonds may be used; friction welding gives strength up to that of the plastics itself; and it bonds well to steel, brass, aluminum, silver, and magnesium. It may be attached to metals by inserting the latter, properly headed, into holes drilled under size.

Experiments show that among its practical uses are such applications as brake and clutch pedals where the thermoplastic can be permanently bonded to steel. Its practical uses in the automotive field also include extruded sealing strips for windows, doors, windshields, and under-door strips. Conduit, special wire insulation, and antenna mast parts are already some of its aircraft uses. Its good insulation, warmth to the touch, and non-skid properties make Styraloy ideal for use as molded handles for hand tools. Other possibilities include specialty flooring for factories and plants where sparkproof qualities are needed, and as scuff boards and non-skid treads for escalators, buses, elevators, and trains.

PROPERTIES OF STYRALOY

Mechanical	
Tensile strength, p.s.i.	900 - 1200
Elongation, %	
Injection molded	10 - 35
Compression and extrusion molded	Up to 250
Impact strength, ft.-lbs. per inch of notch	1.5 - 2.0
Hardness, Shore Type C durometer	66 - 70
Physical	
Specific gravity	0.95 - 0.97
Clarity	Opaque
Color possibilities	Limited
Odor	Slight
Effect of aging	None
Effect of sunlight	Darkens
Chemical	
Water absorption, A.S.T.M., 24 hrs. at 25°C., %	0.2 - 0.5
Resistance to:	
Weak, and non-oxidizing strong mineral acids	Good
Oxidizing strong mineral acids	Discolors
Alcohols, weak alkalies	Excellent
Strong alkalies	Good
Ketones, esters, hydrocarbons	Swells
Mineral oils	Swells
Animal and vegetable oils	Poor to good
Electrical	
Volume resistivity, ohm cm.	10^{16}
Dielectric strength, V/mil, 0.005-in. thick	3000
Dielectric constant, 1,000 cycles	2.4 - 2.5
Power factor, 1,000 cycles	.00025 - .00075
Thermal	
Burning rate, A.S.T.M., in./min.	2.4
Thermal expansion, in./in./°F.	
32 - 180	0.00010
180 - 300	0.000125
Heat distortion, °F.	140 - 149

[1] Abstracted from Plastics, Aug., 1945.

Plastics Exposition and Conference Set Attendance Records

A NEW attendance record for a trade exposition was set by the first National Plastics Exposition, held at Grand Central Palace, New York, N. Y., April 22 to 27, under the sponsorship of the Society of the Plastics Industry. The exposition was held in conjunction with the society's annual conference at the Hotel Commodore, at which a record registration also was recorded.

Plastics Exposition

The exposition, the first attempt to represent the entire industry, occupied two floors of the Palace and had approximately 200 exhibitors, who also included the products of many more hundreds of firms from all over the country. A total attendance of more than 51,000 was recorded for the first three days of the exposition, then open only to members of the trade, and the general public was admitted for the next three days. Voted a great success, the exposition attracted such throngs that admittance had to be restricted because of safety regulations. Ronald Kinnear, chairman of the exposition committee, opened the show by cutting through a coating of vinyl plastic applied by the U. S. Naval Ordnance Laboratory to the front door of the Palace. The show reflected current shortages of material and machinery, with materials producers generally forced to turn away orders, and molding and other machinery manufacturers offering deliveries not before September in most cases.

Finished materials made from the company's plastics were used wherever possible in the construction of the American Cyanamid Co. exhibit, which showed sections on adhesives, molding, and laminating. Featured for the first time were Melmac plastic tableware and fluorescent lighting screens made from Laminac resin and rayon fabric, in addition to other products made from Cyanamid resins and plastics. The Celanese Plastics Corp. exhibited molded products and films made from its Lumarith, Vimlite, and Celluloid plastics and featured a Lumarith "one-shot" syringe set for administration of calcium penicillin. Styron, Ethocel and Saran products were displayed at the Dow Chemical Co. exhibit. Durez Plastics & Chemicals, Inc., had a comprehensive exhibit of its resins and products, including a motor launch made from plywood cemented with Durez resin glues.

The exhibit of E. I. du Pont de Nemours & Co., Inc., in addition to displays of its plastic products for industry, communication, transportation, and the home, showed seven new plastic developments: Teflon, a tetrafluoroethylene resin which is chemically inert and resistant to high temperature; nylon plastic sheeting; CCA, cellular cellulose acetate, a foamed plastic lighter than cork; BCM resin, for use in structural panels when reenforced with glass fabric or other materials; patterned Lucite sheets for lamp globes, windows, office panels, etc.; luminescent Lucite sheets which glow when exposed to ultra-violet light; and a special ultra-violet-absorbing type of Lucite sheeting. Electronic Plastics Co. displayed Homalite plastics, cast resins with good chemical resistance and electrical properties. The General Electric Co. display featured Textolite decorative surfacing materials for table and counter tops and new plastic sealing caps and sleeves as insulators and protectors.

The B. F. Goodrich Co. and the B. F. Goodrich Chemical Co. were both represented with individual exhibits featuring Geon, Kriston, and Koroseal. A feature of the Goodrich Chemical display was a live horse sporting Geon saddle and trappings. The Goodyear Tire & Rubber Co., besides displays of Pliobond adhesive, Chemigum synthetic rubber, and Vitafilm fabricated products, featured its "Stretch-Wrap" packaging machine for Pliofilm, and a new copolymer resin, Pliolite S-5, for use as a substitute for natural oils and resins in paint manufacture.

Hercules Powder Co. displayed cellulose acetate, nitrocellulose, ethyl cellulose and other cellulose derivatives; while Industrial Synthetics Corp. showed Voltron flexible tubing and tape for electrical insulation and Elastron flexible polyvinyl plastic. The plastics division of Monsanto Chemical Co., in a comprehensive display of Lustron, Cerex, Nitron, Fibestos, Thalid, Resinox, and Resimene resins and products, introduced the new Resimene 875 resin for use in surface coatings. Syntilite, a new vinyl-type cast plastic film, was featured by the Plastic Film Corp., and Rohm & Haas Co. showed its "Dream Suite" displaying Plexiglas products for the home, and a new styrene copolymer, Plexene M.

The exhibit of the Naugatuck Chemical Division of United States Rubber Co. featured Vibrin liquid thermosetting resins for use in low temperature and pressure lamination of fabrics and paper and as casting and impregnating resins; Kandar resin for imparting a permanent finish to textile fabrics; PQL high-temperature baking enamel with excellent heat resistance, color stability, and resistance to cracking or chipping; and Kotol industrial coating materials for many applications. The Tennessee Eastman Corp. displayed products attesting to the versatility of Tenite plastics and featured the Plasticor, a miniature, portable, high-pressure injection molding press employing Tenite plastic molding pellets.

Manufacturers of molding and other machines and equipment were prominent at the exposition. Injection and compression molding machines were displayed by Denison Engineering Co.; Hydraulic Press Mfg. Co.; Leominster Tool Co.; Lester-Phoenix, Inc.; F. J. Stokes Machine Co.; and Vickers, Inc. Hydraulic presses and various plastics testing machines were shown by the Baldwin Southwark Division of the Baldwin Locomotive Works; and hydraulic presses were displayed by the Van Dorn Iron Works Co., Denison Engineering, and the Elmes Engineering Works of American Steel Foundries. Hydraulic pumps, valves, and power units were exhibited by the hydraulic division of the New York Air Brake Co. and by Superdraulic Corp. Plastic molds were displayed by the Standard Tool Co. and other manufacturers. High-frequency heating equipment was exhibited by the Thermex division of the Girdler Corp., the electronics division of Illinois Tool Works, and the Thermatron division of the Radio Receptor Co.

Fabricators and custom molders were well represented at the exposition with displays by many companies, including Andover Kent Co., Boonton Molding Co., Celluplastic Corp., Creative Fabrics, Inc., Creative Plastics Corp., Gemloid Corp., Ideal Plastics Corp., Mack Molding Co., Elmer E. Mills Corp., National Plastic Products Co., Plastic Manufacturers, Inc., Shaw Insulator Co., Taylor Fibre Co., and many others.

SPI Conference

The SPI 1946 annual conference included many group meetings, luncheons and dinners, and the annual business meeting. A total of 19 papers on the industry were presented in addition to general speakers.

Great interest was aroused and lively discussion provoked by the paper on "Plastic Materials Supply Situation," presented by W. Stuart Landes, president of the Plastic Materials Manufacturers Association. From the standpoint of the material suppliers, said Mr. Landes, the problems today are more difficult than at any time during the war. Although plants are working at maximum capacity when sufficient raw materials are available, the demand for products exceeds the supply by an average of three to one, and the situation is becoming progressively worse. The total output of plastics today is running almost double that of 1941, and shipments of all types of molding materials are running five to three compared with 1941. Underlying reasons for the high demand are the world shortage of civilian goods and the pent-up demand arising from the war; lack of production by other than U. S. industry; and the further stimulation of U. S. demand by high wages and accumulated savings.

Although expansion in molding was allowed during the war, expansion was almost entirely denied to material producers. In 1944 there were 1,450 injection machines with an average rated capacity of eight ounces, and 650 extruders, excluding rubber machines. Estimates for 1947, based on orders now on hand, show 3,423 injection machines with an average rated capacity of 10 ounces, and 1,094 extruders. The number of compression presses in 1944 was 11,500, and the material supply index 1.0; while estimates for 1947 give 12,867 presses and an index of 1.80. Using 1939 as the base year of 100%, by mid-1946 the total output of plastics will be 394%, and by mid-1947 the curve will reach 547%. The total output of plastics in 1945, excluding alkyds, coumarone-indene, etc., was 500 million pounds: the total output of plastics plus all synthetic resins was 900 million pounds in 1945. According to Gaston Dubois, of Monsanto, the current rate is approximately one billion pounds and will probably reach the rate of 2.5 to 3.6 billion pounds in 1955. In view of such expansion there is little hope that the supply shortage will be overcome and raw materials made available to newcomers in the molding industry for at least five years.



Some of the Booths of the Various Chemical and Machinery Suppliers to the Plastics Industry, First National Plastics Exposition. Note the Live Horse Equipped with Plastic Saddle and Complete Strappings at the Goodrich Chemical Booth and the Laminated Plastics Boat at the Bakelite Booth. The injection Molding Press is by the Hydraulic Press Mfg. Co.

Abstracts of Technical Papers

"Applications of Low-Density Core Materials" was presented by R. A. Hoffer, of du Pont, who stated that the function of the low-density core in sandwich lamination is to increase the stiffness of the structure without correspondingly adding significantly to the weight. The different types of low-density core materials were reviewed, and their use in aircraft parts was listed. Great interest exists in use of these materials in low-pressure fabrication of boat hulls and other structural parts, in the housing industry, in vehicular applications as tops and side panels for trailers and trucks, in luggage applications, in the toy industry, and in domestic applications.

Morris Sanders, designer and architect, spoke on "New and Proposed Applications in the Extrusion Field," reviewing the growth of the extrusion industry and citing its remarkable expansion and complexity in the past 15 years. The current seller's market is not natural, he said, but conditions would return to normal before long, and aggressive product research and sales would bring premiums to those companies employing such methods. Some applications of extruded parts were shown, including furniture, home interiors, hardware, interior decorations, toys, packagings, and others.

"Cost Factors in the Extrusion Molding Industry" was the title of a paper by Nils G. Fischer, industrial engineer and consultant, who said that there are two basic cost systems: first, a job or job lot cost system where the manufacturing costs are charged against specific jobs or lots of production; and, second, predetermined statistical or standard cost system. An analysis of the function of a cost system was presented showing its value in clarifying business progress. A review was also made of the use of a cost system for material cost and control, control of direct labor, and proper evaluation of overhead.

J. E. Stokes, technical representative, Bakelite Corp., spoke on "Low Pressure Molding of Laminates." He reviewed progress in laminating and the development of low-pressure molding, together with its function in producing large molded parts. Phenol-formaldehyde and the ester-type resins are used, and the properties of molded laminates depend upon both the resin and the filler. Continuous laminating, postforming, and deep-drawn laminating were discussed together with specific applications.

John J. Townsend, engineer and consultant, in his paper on "Tooling and Production Methods for Low-Pressure Reenforced Plastics," considered the new techniques in tooling and production which have evolved for molded plywood, formed wood laminates, postformed fabric laminates, fluid pressure molded laminates, and matted fiber reenforced plastics, giving specific examples and applications in each case.

F. H. Carman, general manager of the Plastic Materials Manufacturers Association, dealt with the "Massachusetts Institute of Technology Plastic Research Project." Early in 1944, explained Mr. Carman, plastics producers and users believed that certain phases of the industry's research activities, especially in fundamental research on properties, were not being handled by existing individual company programs. A survey of the industry was sponsored at M.I.T. in 1945 to determine the needs of research and the scope of the work to be undertaken. A number of objectives of the research project already enumerated include determination of purely fundamental engineering properties, training of personnel for the industry, and general technological advancement of the industry. Mr. Carman emphasized that chemical research on new plastics is not a part of the research program at Massachusetts Institute of Technology.

"Field Performance of Forticel," by Burton E. Cash, chief of the Celanese product development division, treated of the properties and some applications of Forticel, a cellulose propionate thermoplastic. The field performance of Forticel in various applications has confirmed laboratory findings and indicates that the plastic will prove one of the most important of the thermoplastic cellulosic type.

In "The Flexural and Impact Tests for Molded Plastics — Their Relation and How to Use Them," H. M. Quackenbos, Jr., pointed out that present flexural and Izod impact tests are not applied with confidence because their predictions are often reversed by field experience. The trouble with the Izod test lies in test procedure, and successful use depends on the notch effect. The speaker urged wider use of notch sensitivity and flexural work to break tests for proper evaluation of molded articles.

Frederick Z. Pearson, manager of the plastics division of Lyon Metal Products, Inc., in his paper on "The Competitive Position of Structural Plastics Materials," said that in many large-area structural products, plastics ultimately can successfully face the competition from different metals and from the various wood base products. Use of plastics in a specific application is influenced by raw material costs which are low, sales volume, production methods, and engineering properties. A need of improvement of methods exists because present methods, although employing low cost tooling, discourage the adaptation of structural plastics to other than small-volume merchandise as they often do not represent the best possible performance of the plastics.

A feature of the conference was the presentation of the annual John Wesley Hyatt Award, sponsored by the Hercules Powder Co., at a dinner on April 24, attended by more than 1,500 members and guests. A dual award was made this year, and a gold medal and half of the $1,000 prize were given to Virgil E. Meharg, development superintendent of Bakelite Corp., and Paul D. Zottu, consulting electronics engineer. Research on high-frequency heating was conducted separately and simultaneously by the two men, and their efforts resulted in speeding up

the curing time of molded and laminated plastics.

At the SPI's annual business meeting on April 23 reports were given by the technical, education, accounting, and public relations committees, and by the executive vice president, Wm. T. Cruse. Amendments to the society's by-laws were voted upon, and results of the elections of officers and directors of SPI announced. Of 544 voting members, 269 cast ballots, of which 258 approved the following slate of candidates: director and chairman of the board, George K. Scribner, president of Boonton Molding Co.; director and president, Neil O. Broderson, president of Rochester Button Co.; director and vice president, George H. Clark, vice president of Formica Insulation Co.; secretary-treasurer, Warren E. Hill, vice president of Prolon plastics division of Pro-phy-lac-tic Brush Co.; other directors, Gordon Brown, Charles F. Elmes, Donald L. Gibb, Herman B. Lermer, W. H. Milton, Jr., Paul C. Tietz, E. L. Anderson, Norman Anderson, John D. Benedito, Robert A. Cooper, and N. J. Rakas.

Shipment and Consumption of Plastics and Resins

THE following statistics represent the shipments and consumption of plastics and synthetic resins for November and December, 1945, as reported to the Bureau of the Census by 74 manufacturing companies and company departments. Data for coating resins are not included.

	Shipments and Consumption (Lbs.)	
	December, 1945	November, 1945
Cellulose acetate and mixed ester plastics:*..	6,559,609	7,831,263
Nitrocelluluse plastics...	1,289,012	1,497,632
Phenolic and other tar acid resins:		
Laminating (dry basis)	2,047,659	2,141,700
Adhesives (dry basis)..	468,617	542,188
Molding materials*....	9,378,740	9,613,359
All other (dry basis)†.	2,866,455	2,334,605
	14,761,471	14,631,852
Urea and melamine resins:		
Adhesives (dry basis)..	2,167,585	2,358,100
Textile and paper-treating (dry basis)..	516,983	465,466
All other (dry basis)†..	361,677	262,124
	3,046,245	3,085,690
Polystyrene.....	2,239,477	2,104,740
Vinyl resins:		
Sheeting and film*....	1,325,870	1,134,895
Textile and paper-coating resins (resin content).....	1,058,465	1,102,032
Molding and extrusion materials*.....	4,753,349	4,813,627
Adhesives (resin content).....	347,221	328,992
All other (resin content)†.....	525,886	478,571
	8,050,791	7,858,117
Miscellaneous plastics and resins: *†‡.....	5,592,672	6,002,812
TOTALS	41,539,277	43,012,106

* Includes filler, plasticizers, and extenders.
† Excludes data for protective coating resins.
‡ Includes data for ethyl cellulose, urea and melamine, acyrlic acid, miscellaneous molding and extrusion materials, petroleum resins, acrylic acid ester resins, mixtures and miscellaneous synthetic resin materials.

Aluminum Foil Laminant

PAISLEY PRODUCTS, Inc., has issued a laboratory report giving the properties and suggested uses of a new synthetic thermoplastic resin emulsion adhesive designed for foil lamination. Recommended primarily for roll applicator machines, the new adhesive will handle all grades of aluminum foil to cellophane acetate, glassine, bond, kraft, sulfite, chipboard, and many other papers and boards.

A non-inflammable white liquid, the resin emulsion weighs 9.07 pounds per gallon, has a viscosity of 400-500 cps., and a pH of 4-4.5. Supplied ready for application, the material can be further diluted with water. It produces a flexible, transparant film which is odorless, non-toxic, and waterproof, but it may be removed by use of naphtha. The film has excellent flexibility in the temperature range of —30 to 300° C. and can withstand 240 hours in cold water or two hours in boiling water before fiber failure. In addition to use as an aluminum foil laminant, it is suggested for use in the manufacture of moisture-vapor proof packages and for general adhesive use on the paper and board materials cited above.

Plastics Discussed

APPROXIMATELY 175 members of the New York Section of the American Association of Textile Chemists & Colorists attended a dinner-meeting March 29 at the Downtown Athletic Club, New York, N. Y. Featured speakers at the meeting were C. W. Patton, manager of the coating and adhesives division of Bakelite Corp., who spoke on "Unsupported Films and Sheetings," M. R. Radcliffe, chief chemist of the plastics division of Firestone Industrial Products Corp., who discussed "Monofilaments and Products Made Therefrom," and R. E. Thomas, laboratory director of the Fabrikoid division of E. I. du Pont de Nemours & Co., Inc., whose topic was "Coated Fabrics — A Guide to Testing."

Mr. Patton's talk, of an introductory nature to the subject of plastics, covered the types of compounding ingredients for plastics and pointed out that the type and the quantity of each ingredient are determined by the service requirements of the finished plastic part. He discussed the effects obtained by varying quantities of the constituents and the effect on the surface of the finished film or sheeting of different manufacturing methods. To illustrate the talk sample films and sheetings were shown as well as products employing such plastics, such as shoe soles and uppers, umbrellas, and others.

In his talk Mr. Radcliffe emphasized that the distinguishing characteristic of monofilaments is their crystallinity, with the molecular orientation obtained by stretching the filaments after molding. As the filaments are non-absorptive, the addition of color presents a problem, and colors are usually incorporated into the raw powder before molding. The filaments are conditioned after molding to reduce shrinkage to a value of less than 1%. Chief characteristics of the finished monofilaments are high tensile strength, resiliency, abrasion resistance, non-absorption and therefore easily cleaned, insolubility in many solvents, resistance to degrading agents, and non-flammability.

Mr. Thomas's talk was concerned with the over-reliance placed on laboratory accelerated tests for evaluating coated fabrics and other materials. He pointed out that dependence upon such laboratory tests alone was extremely hazardous as the results obtained are often not in agreement with those of service tests covering longer periods of time. He gave examples of such disparities occurring in his past experience and warned that laboratory tests, especially of the accelerated type, are useful only if their discrepancies are known and proper adjustments in results are made. It is only after proper correlation with actual service tests that the laboratory tests can be used to control quality in manufacture.

Pyroxylin-Coated Fabrics and Paper

A TOTAL of 59.9 million pounds of pyroxylin was spread during 1945, according to a recent report of the Bureau of the Census, United States Department of Commerce. This represents an increase of 9% over the 54.9 million pounds spread in 1944, but is 2% less than the average for the five-year period, 1941 to 1945. Shipments of pyroxylin-coated fabrics amounted to 75 million linear yards in 1945, as compared with 66 million yards in 1944. Unfilled orders at the end of the year amounted to 12.4 million linear yards, of which 5.6 million were light cotton fabrics, 4.6 million were heavy cotton fabrics, 1.7 million were custom coatings, and the remainder was non-fabric materials.

These data are based on reports of 29 companies to the Bureau of the Census. The statistics presented represent operations of processors who coat or impregnate fabrics or paper with soluble cotton or pyroxylin preparations, either separately or in combination with other materials. "Light" cotton fabrics include sheetings and print cloths; "heavy" cotton fabrics include drills, ducks, sateens, broken twills, and moleskins.

51-Year-Old Mold Still in Use

THE Plastics Division of General Electric Co., Pittsfield, Mass., is still producing parts today from a mold made more than 50 years ago. When the mold was made in 1895, an end insulation ring for a commutator was made in 1895, an end insulation ring for a commutator was made from a combination of rubber, asbestos, and sulfur, and the part was produced by preforming in a cold mold and then finishing in a hot mold hydraulic press. Today's parts are made from phenolic plastic material in a regular compression molding press.

RUBBER WORLD NEWS of the MONTH

Highlights—

A peacetime production rate in the rubber industry 20% above 1940 has aggravated a raw and component supply situation that just managed to weather the war period. Optimism, however, was expressed by industry leaders and trade analysts with regard to the production and earnings outlook for the rubber manufacturing industry for the next two or three years. Not only has the amount of natural rubber received since V-J Day been disappointing, but we are now faced with the difficulty of producing enough synthetic rubber because of the world demand for grain for food, which limits the output of alcohol-butadiene plants. It is expected that the OPA will grant price relief to the tire manufacturers during May. Industrial relations continued generally satisfactory, except for local disputes of minor nature.

Reconversion Boom Threatened by Material Shortages

Despite shortages of raw and component materials, which are becoming increasingly serious, the overall, long-term outlook for a high volume of production by the rubber goods manufacturing industry continued favorable. Imports of natural rubber increased slowly, although still lagging far behind the demand, and consumption of synthetic rubber is so far ahead of production that a very considerable shrinkage of the existing inventory of synthetic rubber has occurred. A Department of Commerce report on the 1946 outlook for natural rubber suggested that the shortage of this material would not be eliminated for some time. An increase in the price of replacement tires is expected in the near future. The Department of Justice announced that it had authorized an investigation of the tire industry to determine if anti-trust laws had been violated.

Optimism Expressed by Industry Heads

John L. Collyer, president of The B. F. Goodrich Co., speaking before the Chicago Technical Societies Council on March 22, forecast that American tire production would total 90 million units for 1946 and urged that synthetic rubber research be pushed to the utmost for the next two years "and the road kept open for private purchase and operation of the plants." Mr. Collyer pointed out that rubber industry reconversion has been rapid and that tire production this year will be at a rate 46% above the 1940 level of output.

Airplane tires can be promised for almost immediate delivery; truck and farm tires should be in ample supply by midsummer, but for passenger-car tires several weeks may elapse between placing an order and receipt of the tires. By the end of 1946 passenger-car tires of any brand and number should be available.

When supply has fully caught up, Mr. Collyer said, "There should be no reason for not taking tires out of price control."

He stated all large tires may be decontrolled by midsummer, and passenger-car tires by early next year, and "I hope and urge that these and other government controls be discontinued as rapidly as possible."

The speaker voiced approval of the fact that the recently released report of the Inter-Agency Policy Committee on Rubber consistently emphasizes the desirability of ultimate private rather than governmental ownership and operation of synthetic rubber plants. He also expressed the opinion that during the next two years, while natural rubber is regaining its prewar production rate, research may bring about the quality improvements and cost reductions in general-purpose synthetic rubber that will enable it to stand on its own feet in competition with other materials.

"That would largely solve the question as to ownership and operation of the plants," he added, "for private enterprise will see to it that synthetic rubber production and development will continue on the largest peacetime scale that can be justified economically."

Mr. Collyer predicted an eventual all-in price for privately produced synthetic rubber of from 15 to 17¢ a pound.

The largest peacetime production in its history will roll from the plants of the rubber industry this year, according to Herbert E. Smith, president of United States Rubber Co., in a statement issued in Chicago on April 1. The value of the goods to be produced is estimated at $1,750,000,000, an increase of 87% over 1940, the previous peacetime peak year, when output was valued at $940,000,000, Mr. Smith said. A production of between 85,000,000 and 90,000,000 tires was predicted. Of the total tire production about 14,000,000 will be for trucks and buses, 4,000,000 for farm tractors and implements, and the remainder for airplanes, automobiles, and industrial uses. Farm tire output reached its all-time high in 1945 with a total of 2,695,000 units, but that amount will be surpassed by 48% in 1946. Farm tire demand and supply are already in reasonable balance, and the same will be true of truck and bus tires by July 1. Motorists should be able to buy needed passenger-car tires by autumn, but normal inventories will not return before 1947, according to Mr. Smith. The consumer in need of other rubber goods such as footwear, golf balls, etc. also should find these in better supply during the latter half of 1946. It was also emphasized that along with the high level of production of old line products, many new and interesting products are beginning to emerge from the laboratories and take their place in the production line.

Another Industry Appraisal

Standard & Poor's Corp. of New York in a bulletin entitled "Industry Surveys—Tires and Rubber," issued on April 12, also took the position that with the expected peak peacetime sales of tires as well as other products for at least the next two years, this should be translated into new record profits for many companies in the industry, accompanied by more liberal dividends. For the longer-term outlook, it was stated that once the initial buying spree has spent itself and deferred demand has been filled, sales of tires and tubes will again be subject to wide cyclical fluctuations. Moreover, as soon as demand slumps, the problem of overcapacity, which has been intensified by wartime additions to facilities, will probably become acute. Thus there is a distinct possibility that the adverse effect of lower sales on earnings will be aggravated by a recurrence of the disastrous price wars characteristic of the industry in the past, according to Standard & Poor's report. On the other hand a greater degree of stability should be injected both by the trend toward diversification of rubber company operations and, more important, by the existence of a large domestic synthetic rubber industry, the report adds.

An analysis of the replacement, original equipment, and export demand for tires during 1946 and 1947 is provided, with some comment on retail price structure, changed distribution channels, and tire rebuilding. An eventual average annual market of $100,000,000 for rubber products for the farm is predicted. On the subject of the outlook for industrial items it is stated that:

"A particularly encouraging angle to the long-term upward sales trend of miscellaneous rubber products is the beneficial effect on rubber companies' profit margins. Since such products are sold to several different industries, there is not the concentration of buying power found in the automobile group, and margins are considerably wider than those obtained from tire sales."

A rather comprehensive survey of the position and future outlook for stocks of rubber industry companies indicates that the industry and its stocks may become less erratic. Income account and balance sheet statistics for Firestone, General Tire, Goodrich, Goodyear, Lee Rubber, and U. S. Rubber are followed by individual company analyses of Dayton Rubber, Firestone, General Tire, Goodrich, Goodyear, Intercontinental, Lee Rubber, National Rubber Machinery, Norwalk Tire, Seiberling, and U. S. Rubber.

Reconversion Boom Threatened

Paradoxically enough, the peacetime reconversion boom in the rubber industry, which has exceeded expectations and the production level of which is reported to be 20% above that of 1940, is the major cause of most of the worries of the industry at present. Bottlenecks and material shortages were nu-

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merous and troublesome during the war period, but generally speaking, the situation is reported to have gone from bad to worse during the past two or three months.

Management executives are forced to contend almost daily with shortages of rubber, both natural and synthetic, chemicals, and other necessary components. During March, shortages of textiles were threatening either curtailment or complete loss of production in some rubber goods plants. New regulations for "set-asides" of industrial fabrics by the CPA and a program of incentive pricing of these fabrics by the OPA, as issued early in April, provided some hope of relief. It is understood that movement of some of these fabrics to rubber industry users has improved somewhat. But failure of the OPA to include enameling, hose and belting ducks in this incentive pricing program still leaves some branches of the rubber industry in a bad position. From the textile industry's side of the picture, a report attributed to one of the leading textile manufacturers states that the price of yarn used in making 28- and 32-ounce belt duck costs the mill 46.48¢ a pound, yet under current ceilings the mill can charge only 48.66¢ a pound for this product.

A new threat to rubber goods production is found in the reports of a possible shortage of synthetic rubber. The stockpile of synthetic rubber, which stood at 170,000 long tons on January 1, dropped to about 156,000 tons on February 1. Although the Institute, W. Va., alcohol-butadiene plant was put back in production on March 1, an inquiry to the Office of Rubber Reserve during the latter part of April produced the information that the inventory of GR-S, as of April 1, totaled only 90,000 tons, of which 60,000 tons were in the hands of the rubber goods manufacturers. It was also indicated that with the world demand for grain for food, alcohol-butadiene plants could not be expected to continue operation for more than two or three months. If synthetic rubber consumption is maintained at its present level, the CPA may have to resume the allocation of synthetic rubber, according to another report.

The shortage of rosin and rosin derivatives for use in synthetic rubber production and compounding also continued to cause concern. The entire component materials situation has become so tight that the Rubber Division of the CPA has called on the industry for additional help, and several technicians have been loaned to the Division to help relieve this component material shortage, if possible.

Tire Price Advance and Industry Inquiry

As a result of discussions which have been going on for some time in Washington between tire manufacturers and the OPA, an increase in the price of replacement tires of about 5% on passenger-car sizes and about half that amount on truck and bus sizes is probable during May. How much more the price of tires for original equipment will be is still not settled. Other problems involve what part, if any, of the price increase will have to be absorbed by the dealers, and the fact that there have been some instances in the Midwest of dealers selling truck tires well below ceilings. In general, distributers have been selling tires at the OPA ceiling except in this one section, it is reported. Another complicating factor, however, is that the "pent-up demand" for truck and bus tires seems to be lower than estimated. It has been suggested that if production of this type of tire is maintained at its present level for a few more months, it may be possible to remove price ceilings.

In connection with this problem of tire prices, it was announced from Washington on April 12 that the Department of Justice had authorized a grand jury investigation of the tire industry to determine whether anti-trust laws had been violated. The inquiry was ordered, a statement said, after the Department of Justice had received "a large number of complaints charging restraints on competition and discriminatory practices in the industry." The investigation will be country-wide and will be conducted from the Southern District of New York. A spokesman for the industry reported that the authority of the grand jury was being used to obtain the necessary records from various tire companies, but no one will be required to appear before the grand jury until if and when violations were found. It was estimated that it would be six to eight months before the investigation would reach that stage.

Tire Production and Export

There was a decline of 171,371 units in the production of tires during February as compared with January, according to the regular monthly report of The Rubber Manufacturers Association, Inc. The decline was attributed to a shorter working month. While production was down 2.87% in all classes of tires, average daily production showed an increase.

February production of passenger-car tires was 4,585,398, and truck and bus tire production 1,216,021. Tube production was 5.05% above the January level.

Unofficial estimates on weekly production during the latter part of April indicated that the rate of output was continuing to climb. The Association commented, however, that tire manufacturers are faced with shortages of materials, chiefly in textiles, which might seriously interfere with production in the later months of the second quarter.

The detailed report appears in the table below.

The CPA announced on April 8, a second-quarter tire export quota which would permit the licensing of shipments totaling 937,500 new and used truck, bus, and passenger-car tires during April, May, and June. The quota continues a policy of holding tire exports to about their prewar percentage of production, despite greatly increased foreign demand, the CPA said. Although the percentage of tire production exported remains virtually unchanged, general expansion of tire production has permitted a numerical increase in exports. The second-quarter quota will permit new truck and bus tire export licenses adding up to 425,000 units, as against 335,000 permitted in the first three months of 1946. The second-quarter quota for new tires for passenger cars is 200,000, as against 150,000 for the first quarter. The first-quarter quota of 242,500 for used and recapped truck, bus, and passenger-car tires of all types has been increased to 312,500 in the second quarter. It was pointed out that actual shipments may lag behind the licenses both in time and amount.

ESTIMATED AUTOMOTIVE PNEUMATIC CASING AND TUBE SHIPMENTS, PRODUCTION AND INVENTORY—FEBRUARY, 1946 AND 1945, JANUARY, 1946

	Original Equipment	Replacement	Export	Total Shipments	% of Change From Preceding Month	Production During Month	% of Change From Preceding Month	Inventory End of Month	% of Change From Preceding Month
Passenger Casings									
February, 1946.....	269,988	4,033,792	29,478	4,333,258	—1.09	4,585,398	—2.54	2,495,805	+ .59
January, 1946	361,532	3,984,061	35,404	4,380,997		4,705,092		2,481,053	
First 2 mos., 1946..	631,520	8,017,853	64,882	8,714,255		9,290,490		2,495,805	
First 2 mos., 1945..	48,164	3,513,740	31,591	3,593,495		3,491,681		1,036,037	
Truck and Bus Casings									
February, 1946.....	205,556	866,156	63,268	1,134,980	—1.83	1,216,021	—4.08	990,944	+3.77
January, 1946.....	214,584	885,705	55,868	1,156,157		1,267,698		954,980	
First 2 mos., 1946..	420,140	1,751,861	119,136	2,291,137		2,483,719		990,944	
First 2 mos., 1945..	1,138,817	2,250,321	20,623	3,409,761		3,559,071		913,459	
Total Casings									
February, 1946.....	475,544	4,899,948	92,746	5,468,238	—1.24	5,801,419	—2.87	3,486,749	+1.48
January, 1946	576,116	4,869,766	91,272	5,537,154		5,972,790		3,436,033	
First 2 mos., 1946..	1,051,660	9,769,714	184,018	11,005,392		11,774,209		3,486,749	
First 2 mos., 1945..	1,186,981	5,764,061	52,214	7,003,256		7,050,752		1,949,496	
Passenger Trucks and Bus Tubes									
February, 1946.....	491,670	3,806,159	88,391	4,386,220	+2.32	4,874,026	+5.05	4,417,884	+7.21
January, 1946.....	601,821	3,602,552	82,574	4,286,947		4,639,762		4,120,673	
First 2 mos., 1946..	1,093,491	7,408,711	170,965	8,673,167		9,513,788		4,417,884	
First 2 mos., 1945..	1,201,250	4,906,741	30,993	6,138,984		6,759,881		3,289,706	

Surplus Property Disposal

A government-owned hose assembly plant at Belleville, N. J., where the Resistoflex Corp. manufactured hose assemblies to carry gasoline, oil, solvents, and similar-type products, was announced as being for sale or lease on April 1 by the War Assets Corp. The plant has a working area of 12,600 square feet, and on the premises are 59 items of machinery and equipment including a revolrator, hand trucks, steel reels, racks, and platform trucks.

A Connecticut facility has been sold to the Norwalk Tire & Rubber Co. for $260,000, it was announced April 5. The plant, when completed, will be used for the production of tires and will employ about 250 persons.

It was announced on April 9 that Plancor 2208 at Des Moines, Iowa, had been sold to the Firestone Tire & Rubber Co. (present lessee) for $3,400,000. The sale covers land, leasehold improvements, buildings and building installations, together with a part of the machinery and equipment. The plant was built to make heavy-duty military tires and tubes. Firestone expects to produce tractor and earthmover tires at this plant.

The Des Moines, Iowa, Army ordnance plant operated by the United States Rubber Co. during the war was offered for sale on April 11. This plant site covered 4,448 acres and included five manufacturing buildings of reenforced concrete with 180,000 square feet of working space each, a storage warehouse, warehouse building, two shops, four power houses, and two administration buildings. Much of the equipment used when the plant was in war production is still in the manufacturing buildings.

Designed to produce coke and by-products, such as coal tar, benzol, toluol, ammonium sulfate, and gas, the Tennessee Products Corp. plant at Chattanooga, Tenn., has been sold to that company for $600,000, it was announced April 11. The same products will be produced for postwar civilian consumption.

The War Assets Administration announced on April 16 that the sale of the Air Reduction Sales Corp. plant at Brooklyn, N. Y., to the Elm Coated Fabrics Co., New York, N. Y., for $93,200 had been approved, subject to compliance with the Surplus Property Act and the applicable regulations issued thereunder. Elm Coated Fabrics expects to produce plastic and rubber coating for fabrics at this plant.

The Natural Rubber Picture

A report on the 1946 outlook for natural rubber issued by the Department of Commerce, April 4, was prepared by Everett G. Holt, Rubber Advisor, Industry Division, and pointed out that the United States rubber products industry must continue to rely chiefly on synthetic rubber, at least until the end of 1946. The contents of this report were similar to those found in the report of Mr. Holts' talk before the Connecticut Rubber Group on February 15, published on page 824 of our March issue.

The Commerce Report

Mr. Holt referred to the estimate of the November, 1945, London meeting of the Rubber Study Group and its estimate of 625,000 long tons of natural rubber available from all sources during 1946. Of this quantity, 178,000 tons are expected from Ceylon, India, Papua, tropical America, and Africa—areas which were accessible to the Allies during the war; 250,000 tons from stocks found in liberated Far Eastern countries, and only 197,000 tons from new production in the liberated Far Eastern countries. If the 625,000-ton figure is reached, the United States is expected to obtain by allocation up to 300,000 tons.

After 1946, declining shipments — 158,000 tons in 1947, 156,000 tons in 1948—are expected from areas accessible during the war; while amounts from Far Eastern countries liberated from Japan will depend on how quickly restoration of their completely disrupted economic structure can be effected. Complete rehabilitation will certainly be a matter of years.

Mr. Holt then reviewed the favorable and unfavorable factors connected with the speedy resumption of rubber output in the liberated areas. The need of American exchange, the fairly satisfactory condition of trees generally reported, and the availability of indigenious labor, normally self-sustained in food crops, for native rubber production in Malaya, Sumatra, Dutch Borneo, Siam, and Sarawak and for estate production in Java, Indo-China, and Burma were cited as favorable factors, but were considered as heavily outweighed by unfavorable factors such as the disturbed political situation in Java and Sumatra, the shortage of consumer goods in the rubber producing areas, and the shortage of labor in Malaya and probably Sumatra, and the disruption of transportation.

New production in liberated areas in 1946 will depend chiefly on what is done to stimulate and facilitate trade with native rubber producers. Their potentialities are large — Malaya, 250,000 tons; Sumatra, another 250,000; Dutch Borneo, 100,000; Siam, 50,000; and Sarawak, perhaps 40,000; or a total of 690,000 tons. With the assured start of some production on estates in British Malaya in 1946, fractional output by native producers would be sufficient to meet the estimate of 1946 arrivals in consuming countries of 197,000 tons from new production in the liberated areas. Already rubber is being bought by the British in Malaya and by the Dutch in Borneo. Resumption of buying in Siam and Sarawak is under way.

Rubber output is traditionally subject to swift changes, and since present estimates are conservative, there may be a more rapid increase in production than seems probable under the conditions outlined above, Mr. Holt stated. Settlement of political troubles would change the picture; it is difficult to believe that, even without settlement, the huge production potentialities of Sumatra can long be completely bottled up, while the world waits impatiently for natural rubber, he added.

Mr. Holt is scheduled to leave about May 1 for a three-month trip to the Far Eastern rubber producing areas for the Department of Commerce and the Rubber Development Corp., RFC. He will attempt to make an "on the spot" survey of the factors involved in speeding up the resumption of shipments of natural rubber from the Far East at their prewar level. Mr. Holt expects to visit Malaya, Siam, Indo-China, and the Netherlands India areas if conditions permit.

Other Reports

Another report on the conditions in the Far East by W. E. Cake, assistant managing director of the plantations division of United States Rubber Co., recently returned to this country after his interment by the Japanese, will be found in the article section of this issue of INDIA RUBBER WORLD.

According to an Associated Press report from Tokyo on April 15, the Japanese Government has been ordered by Supreme Headquarters to prepare to export to the United States 10,000 metric tons of rubber, not less than half of which must be grade one rubber.

According to information from publications of the U. S. Department of Commerce, imports of crude rubber for January, 1946, totaled 44,182,000 pounds, or about 19,750 long tons, as compared with imports during December, 1945, of 31,610,000 pounds, or about 14,100 long tons. Imports during January, 1945, however, were listed as 37,709,000 pounds, or about 16,800 long tons.

An AP report from Batavia, Java, dated April 14, stated that among the American and British business agents and technicians waiting in British and Dutch controlled areas for some degree of stability in government were representatives of U. S. Rubber, Goodyear, the Hawaii-Sumatra Co., and the Continental Rubber Co.

A report to the *New York Times* on April 7 from London stated that much disappointment was felt in London over the continuation of the contract price of 20¼¢ per pound for natural rubber f.o.b. Far Eastern ports for sale to the United States. The price is to be continued until the end of June, 1946.

Industrial Relations News

Industrial relations in the rubber industry were generally good during April, following the Big Four — U.R.W.A. agreement of March 2. However, there were a number of minor disputes between management and labor of various companies, some of which resulted in work stoppages of a few days duration. These disputes were concerned with local grievances involving working conditions and negotiations regarding wage increases for workers not included in the Big Four agreement.

Because of dissatisfaction with the company's offer of a 5¢-an-hour wage increase, U.R.W.A. local No. 178 at the plant of the Dayton Rubber Mfg. Co., Dayton, O., met on March 31 to take a strike vote. N. R. Miller, the com-

pany's industrial relations director, said that the offer of a 5¢ hourly increase would advance rates above those paid by companies that have granted an 18½¢ hourly raise. It is understood that the dispute was settled without a strike although complete details are lacking.

Local No. 5 of the U.R.W.A. at the Akron plant of The B. F. Goodrich Co. voted on April 7 for a strike if the deadlock of the wage negotiations for plant guards, office workers, service and sales employes was not broken. For plant guards, the union asked $260 a month, as compared with $213 a month offered by the company. There was a six-day strike of 300 tube room workers at this plant from April 5 to April 11 because of a dispute over a new wage rate and the application of an adjustment to an old rate. L. S. Buckmaster, general president of the U.R.W.A. entered the dispute between the Goodrich management and the local No. 5 on the matter of wage increases and working conditions for plant guards, office workers, etc., but late in April the issues still remained unsettled. No strike had been called, however, up to that time.

Tire production at the Goodyear Tire & Rubber Co. plant in Akron was curtailed for most of the week beginning April 15 by a work stoppage in the curing room. This dispute was due to the transfer of six workers from the curing room to another department, thus leaving a smaller number of workers to do the work. Company spokesman said the transfer was in connection with the elimination of a temporary operation which regular operators previously had performed. Two thousand workers were temporarily made idle, but the dispute was settled, and the production of tires was resumed by the end of the week.

A similar type of dispute threatened to result in a work stoppage at the Akron plant of the Firestone Tire & Rubber Co. on April 17. Curing room workers refused to operate seven heater units with seven men. Previously six men had operated six units, with one idle, it was reported. The difficulty was settled without interfering with production.

A strike of about 200 workers in the curing room of the Akron plant of the General Tire & Rubber Co. made 1,400 persons idle at this plant on April 22. It was reported that the dispute started on April 20 when employes in the curing room asserted that a rescheduling of work in that department resulted in a wage cut. Officers of local No. 9 of the U.R.W.A. said they had urged the workers to return to their jobs and negotiate the dispute.

Charles T. Wilson Co., Inc., dealer in crude rubber, liquid latex, and foreign produce, 120 Wall St., New York 5, N. Y., reports that R. A. "Otto" Favenza, who temporarily left the company's employ during the war period to represent the Rubber Development Corp., Washington, D. C., in Colombia and Ecuador, has returned to the Wilson organization after nearly four years to act as salesman-representative for the company throughout Latin America.

OPA Changes Footwear, Mechanicals Regulations

Dollar-and-cent ceilings have been established for 20 additional types of men's and women's rubber footwear declared surplus by the Armed Forces and war agencies and now being sold by the government for civilian use, according to Revised Order No. 91 under SO 94—Maximum Prices for Sales of Surplus Rubber Footwear — effective April 18. Retail ceilings are identical with prices for similar items being sold in regular civilian channels. Added to the list of rubber footwear for which maximum prices were established are: additional types of rubber boots, some pacs and lumbermen's overs, arctic gaiters, rubbers, and canvas rubbers. Exempted from price control are: men's powder plant over-the-shoe boots, women's 10-inch pullover boots (conductive sole), men's electrically heated flying boots, pilot's shoes, men's wading shoes, men's open shank safety sole clogs, and all items of used rubber and canvas footwear. The War Assets Administration reports that some of these items are now available for sale through the regional offices of that agency.

Retail ceilings for men's new black rubber half heels declared surplus by the Armed Forces have been established at the same levels already applicable to heels of the same type ordinarily sold in civilian channels, according to Order 110 under Supplementary Order 94—Special Maximum Prices for Rubber Heels—effective April 3. These ceilings are 25¢ a pair with nails, when sold unattached to shoes, and 55¢ a pair when sold attached to shoes.

War Assets Administration has advised OPA that approximately 1,400,000 pairs of these heels will be offered for sale by its New York, Fort Worth, Kansas City, and Nevada regional offices.

Ceilings on sales by the government have been as follows: on sales of all sizes up to 13/14 to shoe manufacturers, 5½¢ a pair; on sales of all sizes 13/14 and larger to shoe manufacturers, 6½¢ a pair; on sales to wholesalers, 10¢ a pair; and on sales to retailers and shoe repairmen, 13½¢ a pair.

Wholesalers' ceilings will be 15½¢ a pair.

Government and wholesalers' ceilings are for the heels "as is, where is," without nails, and with delivery costs at the buyer's expense.

Manufacturers' dollar-and-cent ceilings for waterproof rubber footwear have been increased 10% by Amendment 15 to MPR 132 — Rubber Footwear—effective April 1, 1946. This increase has been granted to take care of higher costs for labor and materials in waterproof and canvas rubber footwear and to allow the industry the same profit margin as in 1936-1939. No change is made in canvas rubber footwear prices or in wholesale and retail maximum prices for footwear. OPA said that if, on further study, it appears the increase in manufacturers' ceilings cannot be absorbed by resellers, appropriate action will be taken.

Order 15, MPR 200, authorizes ceilings for men's molded brown and leather color plastic half soles made in part of rubber by O'Sullivan Rubber Co., Winchester, Va.

Order 16, MPR 200, sets maximum prices for women's composition half-soles, black and tan, 7½-iron, bearing the brand name Aristocrat and made also by O'Sullivan.

Amendment 16, MPR 477—Sales of Rubber Heels and Soles in the Shoe Factory and Home Replacement Trades —restores two footnote references in Appendix C which were inadvertently omitted from Amendment 15.

Order 22, MPR 477, establishes maximum prices for certain composition half soles of the trade names Panco, Panco Corrugated, Sure Step, Pancrom, and Monogram, made by Panther Panco Rubber Co., Inc., Chelsea, Mass.

Region VII Order G-5 and Region VIII Order G-8, under Supp. Serv. Reg. 47 to RMPR 165, cover maximum prices for shoe repair services in Idaho and Oregon and in Los Angeles and San Diego metropolitan areas, respectively.

Revisions on Mechanical Rubber Goods

Amendment 25, MPR 149—Mechanical Rubber Goods—makes changes in the tables in Appendix D relating to manufacturer's maximum list prices for rubber flooring other than neoprene flooring.

Amendment 26 raises manufacturers' maximum prices for friction tape and splicing compound to encourage production.

Increases have been allowed in manufacturers' maximum prices for rubber hose, belting, packing and hard rubber SLI battery containers, covers, and vents, by Amendment 27 to MPR 149. The increases, effective April 8, range from 12 to 26% for rubber hose, belting, and packing, and are about 15% for the battery containers, covers and vents. For belts and hose the increases have been granted to take care of higher costs for labor and materials and maintain the industry's 1936-39 return on net worth. For battery container and packing the increases allow industry to recover total costs. These products are all sold to industrial users, and the cost of living is not affected by this action.

At the same time manufacturers of molded, extruded, lathe-cut, and chemically blown sponge rubber products are permitted to raise their ceilings up to 15% on "standard list" items. Previously a similar increase had been permitted on "regularly quoted" items, and Amendment 27 merely extends the increase to "standard list" items. Studies now completed show that the same increase is required on the "standard list" group of products to meet higher labor and material costs.

Amendment 28 makes several revisions in the regulation. First, it changes the definition of "manufacturer" so that a producer of mechanical rubber goods is now a "manufacturer", as defined in the regulation, whether or not he produces a rubber portion of the mechanical rubber goods. Consequently sellers of this class must now recompute their maximum prices in accordance with provisions of Amendment 28, as a "manufacturer" and not a "wholesaler" as formerly was the case with those who produced no rubber parts for their mechanicals, but bought and assembled them.

This amendment also requires that all manufacturers of neoprene covered rubber thread recompute their ceiling prices, using the generally lower prices of neoprene bare rubber thread in effect since August 6, 1945. Further, these recomputed ceilings must be reported to the OPA.

Amendment 28, moreover, clarifies MPR 149 relative to the exclusion of mechanical rubber goods automotive parts from the regulation at the wholesale level as most automotive parts at this level are priced under MPR 453—Wholesalers and Retailers Maximum Prices for Automotive Parts. Since some automotive parts are not priced under the wholesale level in MPR 453, they are to be included under MPR 149.

MPR 149, it was explained, applies generally to mechanicals used by industrial users, but some of the general categories of goods listed in the regulation were so broad that it was believed that a number of items used primarily, however, by individual consumers rather than industrial consumers were covered by MPR 149, such as sink strainers, soap dishes, plate scrapers, and fly swatters. Accordingly Amendment 28 provides that rubber goods used mainly by individual consumers are not covered by the regulation even though they are also used by industrial users and that mechanical rubber goods used primarily by industrial users (such as hose, including garden hose, jar rings, plumber's supplies, automotive parts, and friction tape) come under the scope of MPR 149 even though such commodities are also used by individual consumers.

Order 57 to MPR 149 grants price relief to makers and distributors of fabric-backed pressure-sensitive tape by allowing them to bill at prices above present ceilings, but with the notation that such quotations are subject to OPA approval.

Order 136 under 3 (e), GMPR, authorizes maximum prices for Style #733 Plaflote manufactured by Hodgman Rubber Co., Framingham, Mass.

Order 4937, MPR 188, establishes ceilings for a rubber mat, product of Virginia Rubatex—Division of Great American Industries, Inc., Bedford, Va.

Other Rubber Goods Affected

Orders 99 and 100 to RMPR 528 — Tires and Tubes, Recapping and Repairing, and Certain Repair Materials—set ceilings, respectively, for a new-size Waber Double Seal Special Purpose truck tube made by The Waber Co., Chicago, Ill., and for an all-traction logger, an ANS earthmover, and two Rock Grip excavator tires, products of The Firestone Tire & Rubber Co., Akron, O. Under Order 101 are established retail ceilings for two mud and snow truck, a passenger-car, and a truck and bus tire; while the next order authorizes maximum retail prices for two new sizes of industrial pneumatic tires manufactured by The B. F. Goodrich Co., Akron.

On April 19, MPR 220—Certain Rubber Commodities—was reissued to include Amendments 1 through 27. The last amendment provides that manufacturers must recompute ceilings for elastic webbing, braid, and cord to pass on to customers reductions in prices of bare cut neoprene rubber thread since August 6, 1945. The amendment also includes several other minor changes to make provisions of the regulation more specific and clearer to the industry.

Order 764 under 3 (b) sets ceilings for sales of the following protective coatings: Resoweld top coat, Resoweld primer M-191-C, and Resoweld thinner M-199-C, manufactured by Goodyear Tire & Rubber Co., Inc., Akron, O.

Order 117—MPR 220—Certain Rubber Commodities—sets maximum prices for the two basic types of full head-shaped molded rubber bathing caps (aviator type with chin strap and diver type without chin strap). As production of these products was sharply curtailed during the war, the new order takes into consideration higher wage rates and additional material costs incurred by reason of substitution of synthetic for natural rubber.

Two amendments were added last month to MPR 82—Wire and Cable. No. 2 adds a section relating to manufacturers' prices for rubber braid building wires and an index to zones for prices for Types R and RH building wire. Amendment 3 covers prices of products containing silver.

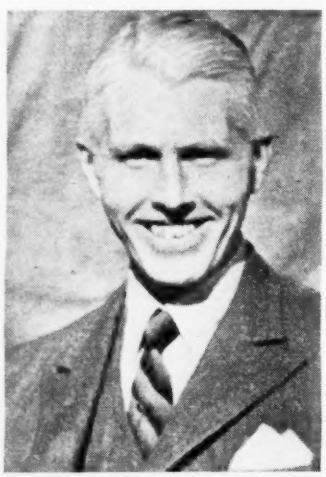
Order 54, MPR 86, approves maximum prices for sales by dealers to consumers of the "Woman's Friend" washing machine, made by Central Rubber & Steel Corp., Findlay, O.

SO 94, Amendment 1 to Order 25, amends the description of the gloves in paragraph (b) to read as follows: "Surgeon's rubber gloves, medium weight, rubber grade A.015 gage, black and brown."

Rev. Order 21, RMPR 86, establishes ceilings for sales by dealers for five models of Firestone brand washing machines.

English Technologist Visiting U. S. A.

Frank H. Cotton, senior lecturer in rubber technology at Northern Polytechnic, London, England, is visiting the United States for the next several months for the purpose of comparing developments in the technology of rubber, synthetic rubber, and plastics in this country with those in England. Mr. Cotton has been awarded a Leverhulme Research Fellowship in this connection. He will welcome an opportunity to discuss topics of mutual interest with authorities in various branches of the industry and hopes to have the privilege of visiting factories and laboratories in the United States and Canada.



F. H. Cotton

Mr. Cotton began his career as a metallurgical chemist in an automobile factory, but has specialized in rubber since 1923. For several years he was honorary secretary of the London Section of the Institution of the Rubber Industry, of which he later became chairman. He is at present on the Council of the Institution, which he represents on the British Parliamentary and Scientific Committee.

Mr. Cotton is particularly interested in the influence of traces of oxygen on rubber. In 1931 he published the results of experiments showing that oxygen is essential to the breakdown of rubber during milling. During the war this worker was associated with P. A. Gibbons in developing a new rubber reclaiming method.

Mr. Cotton's address is this country is 244 Washington Ave., Rutherford, N. J.

Use of Crude Rubber Limited

Last month CPA restricted the use of natural rubber by the issuance of Direction 13 and Amendments 1 to R-1, as Amended March 1, 1946. The first order limits the use of the choice grades of natural rubber—pale crepe, both thin and thick—to the manufacture of specified medical articles and to products that come into contact with food, as no pale crepe has been received in this country in the last four years, and none is expected this year. According to the order, thin-type pale crepe may be used only for: dental dam, denture rubber, nursing breast shields, small feeding nipples, colostomy outfits, dilators, inhalation bags and face pieces, prostatic bags, prosthetic devices, stoppers—medical, surgical, dental, veterinary, and mortuary type only (only 50% of natural rubber may be thin pale crepe), vaccine caps, pessaries and prophylactics, tubes and tubing-blood plasma, intravenous, and multiple lumen only. Permitted uses of thick pale crepe natural rubber include: refrigerator door gaskets, surgical tape and cohesive bandage, feeding bottle caps and covers, large breast-type feeding nipples.

Amendment 1 to R-1 prohibits the use of natural rubber for sponge play balls, corrects an omission in the order to show an allowance of 3% natural rubber for industrial vacuum hose, and reduces from 200 to 25 pounds the amount of Butyl that may be used each month for experimental purposes by a manufacturer without specific authorization.

Sanitary Rubber Mat Co. is the firm name under which David Grant has published a certificate that he is conducting business at 2230 Main St., Santa Monica, Calif.



Dwight P. Allen
Promoted by Thermoid
(Page 248)



Charles K. Novotny
New Vice President
(Page 256)



Chidnoff
W. C. Kabrich
Joins Flintkote Co.
(Page 248)



H. G. Staley
Pacific Sales Manager
(Page 260)



Thomas L. Stevens
New Hall Executive
(Page 254)



James S. Barrie
New Hood Officer
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Robert V. Yohe
American Anode Head
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William I. Burt
Advanced by Goodrich
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Frank K. Schoenfeld
Named Vice President
(Page 254)

EASTERN and SOUTHERN



Architect's Drawing of du Pont's New Laboratory and Sales Building in Akron

Du Pont's War Output Record

The full scope of the war production role of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., was revealed in a special report by the president, W. S. Carpenter, Jr., to stockholders. During each of the last three war years the company increased its production of chemical materials from its own plants to more than double 1939 levels. In addition du Pont built for the government 54 plants of various sizes at 32 different locations. Total cost of these facilities, engineered, designed, and constructed by the company's engineering department, was $1,034,000,000. Du Pont operated, government owned plants produced military explosives, ammonia, methanol, neoprene, and various chemical specialty materials with a total value of $895,000,000.

Materials produced for military and civilian consumption covered a wide industrial and domestic range. Major items included: 537,700,000 pounds of rayon yarn and staple fiber, of which 23% (125,000,000 pounds) was Cordura high-tenacity tire cord yarn, 12,500,000 pounds were textile Cordura, and the remainder was other viscose and acetate yarns and staple; 80,000,000 pounds of nylon yarn and flake; 301,932,000 pounds of neoprene, of which 72,687,000 pounds were made at the Deepwater, N. J., plant, and 229,245,000 pounds were made at the Louisville, Ky., plant; and 26,153,000 pounds of Lucite sheeting for transparent aircraft enclosures.

The company's accident frequency rate averaged 1.44, compared with a general wartime average of approximately 10 for the entire chemical industry, and 14 for the nation's industry as a whole.

Neoprene for Greater Efficiency and Longer Wear

Neoprene is now being formulated with abrasive particles into tiny resilient pellets that act as grindstones to smooth the rough edges of metal stampings, castings, and precision-machined parts. The pellets are used in tumbling barrels for deburring parts made of brass, steel, of the light metals. A well-known manufacturer selected neoprene after testing more than 100 combinations. The pellets are composed of aluminum oxide bonded with neoprene and may be used in virtually any tumbling barrel, although a special barrel lined with neoprene is recommended by the manufacturer. This neoprene lining, it is claimed, resists abrasion and prevents damage to delicate parts in the tumbling operation. The synthetic rubber in the pellets serves as both a cushioning agent and as a matrix for the abrasive. It also supplies a flexible backing for each particle of abrasive, insuring a constant even honing pressure as the abrasive removes burrs and sharp edges. The soft neoprene binder permits penetration into threads and serrations, bringing the abrasive into contact with all surfaces. Examination of an actual operation showed that some of the pellets wear to small pieces which penetrate into deep recesses and small areas and remain useful until completely worn down.

Test experience of the wear-resistance of neoprene under extreme service conditions is now available from the record of a conveyer belt in use for 18 months raising slate, rock, shale, some coal, dirt and water from the breaker of a bituminous coal mine. According to the report of the user to du Pont's rubber chemicals division, this neoprene belt has handled approximately 225,000 tons of material, and the carcass shows very little wear and will continue to give service indefinitely. Belts of this type must stand heavy loading, the most severe abrasion, and exposure to sunlight, rain, snow, heat, and cold. In this installation the excellent chemical resistance of the material to the sulfur in bituminous coal proved an added advantage. The nature of the refuse presented many sharp cutting edges to scar the belt. Abrasive action was greatest at the loading end, but all parts of the belt were subjected to abrasive wear since the lift is a 19-degree slope. In regular use the belt was heavily loaded and required 75 h.p. to propel it at its operating speed of 248 feet a minute. Du Pont does not make conveyer belts, but supplies crude neoprene to manufacturers of belting.

New Quarters in Akron

The new building to house branch headquarters of du Pont's rubber chemicals division is nearing completion at 40 E. Buchtel Ave., Akron, O. The structure provides for a completely equipped, modern technical service laboratory in addition to sales offices and emergency warehouse facilities. The sales force, under Harry A. Hoffman, manager, expects to move into the new quarters this month.

New York Safety Conference

The sixteenth annual safety conference and exposition was held at the Hotel Pennsylvania, New York, N. Y., April 9 to 12, under the sponsorship of the Greater New York Safety Council and cooperating agencies. The exposition featured the displays of 85 exhibitors manufacturing or supplying safety clothing and equipment. Rubber items were very much in evidence, with the great majority of products made from GR-S, although reclaimed rubber was also represented as were many oil-resisting items made from neoprene.

Firms showing rubber items included the following: Rubber gloves, goggles, and masks were featured by Guardian Safety Equipment Co., East Orange, N. J.; Pulmosan Safety Equipment Corp., Brooklyn, N. Y.; Dunn Products, Chicago, Ill.; American Optical Co., New York; Wahlert Products Corp., Brooklyn; and Mine Safety Appliances Co., Pittsburgh, Pa. Safety shoes with rubber soles and heels were exhibited by Safety First Shoe Co., Holliston, Mass.; Iron Age Division of H. Childs & Co., Louisville, Ky.; Titan Safety Shoe Co., Boston, Mass.; Lehigh Safety Shoe Co., Allentown, Pa.; Thom McAn Safety Shoes, New York; and Sundial Shoe Co., Manchester, N. H. Neoprene and GR-S gloves were displayed by Olympic Glove Co., New York. The W. S. Wilson Corp., New York, exhibited rubber goggles and gloves. Rubber goggles were included in the exhibits of Willson Products Corp., Reading, Pa., and Welsh Mfg. Co., Providence, R. I. The Gro-Cord Rubber Co., Lima, O., showed Neo-Cord shoe soles made of neoprene. Safety mats made by the Ohio Rubber Co. and other manufacturers were featured by A. N. Brabrook Co., New York. The Milburn Co., Detroit, Mich., displayed its line of Ply and Ply-Guard rubber and plastic coated sheeting and clothing.

The safety conference, under the general chairmanship of Harold Segrave, included many talks, panel discussions, demonstrations and committee meetings. A warning that safety standards in many American factories have deteriorated since the end of the war was sounded by M. S. Dickenson, safety director of the Wright Aeronautical Corp., Patterson, N. J. In many industrial plants the safety departments have been or are being eliminated, said Mr. Dickenson. He explained that there were three attitudes toward safety by industrial management. The first type, unfortunately in a great minority, consisted of management backing accident prevention all along the line. The second type appoints a safety director, gives him a fairly free hand, and then forgets all about him. The third group has no regard for safety whatsoever. More active support is needed on the part of management for plant safety programs.

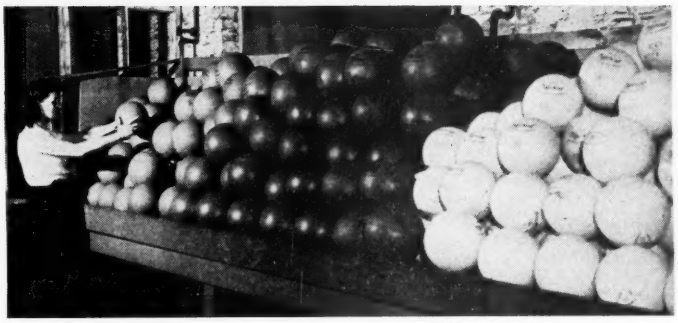
Leases War Plant

Pittsburgh Plate Glass Co., Pittsburgh, Pa., has announced the leasing of a major portion of the government owned plant at Lake Charles, La., by the Southern Alkali Corp., which is owned jointly by Pittsburgh Plate and American Cyanamid Co., New York, N. Y. The Lake Charles plant, built during the war for the Defense Plant Corp., was designed for the production of magnesium metal. Southern Alkali will use it to produce caustic soda and liquid chlorine. An extensive remodeling program, estimated at one year, has begun, and a long-term lease on the property will commence when renovation is completed. According to Harold F. Pitcairn, president of Southern Alkali, the leasing of this plant, which followed by one week the purchase of the chemical plant at Natrium, W. Va., by Pittsburgh Plate, should aid materially in easing the shortage of basic chemicals. Stanley J. Hultman, formerly superintendent of Southern Alkali's main plant at Corpus Christi, Tex., has been appointed plant superintendent of the Lake Charles unit. Administration will be directed from the Corpus Christi office.

Walter K. Farst has been appointed general manager of the Pittsburgh Plate cement plant at Zanesville, O., to succeed the late Arthur R. Haley. Associated with the glass company's Columbia Chemical Division for 23 years, Mr. Farst has been chief engineer in chemical plants operated by the Columbia division for the past five years.

Pittsburgh Plate has appointed Clifford C. Thompson credit manager for its Columbia Chemical Division with headquarters at the division's offices, Fifth Ave., at Bellefield, Pittsburgh. A veteran of World War I, Mr. Thompson has been associated with the company for the last ten years. During the past three he served as a traveling representative of the treasurer for Pittsburgh Plate and prior to that was chief accountant and office manager at the company's Milwaukee branch warehouse.

Columbia Chemical Division has purchased the large chlorine and caustic soda producing plant at Natrium, W. Va., from the Reconstruction Finance Corp. The plant was built and operated by Columbia Chemical for the government's Defense Plant Corp. under a contract which included a purchase option which has now been exercised. Situated on the Ohio River approximately 30 miles south of Wheeling, the Natrium plant first went into production in July, 1943, and is one of the largest chlorine producing plants ever built as a single unit east of the Mississippi. The purchase of the plant is the first step in the division's expansion program designed to meet the industrial demand for critical basic chemicals. Manufacture of chlorine at the plant is accomplished by electrolysis of salt brine obtained from wells in that area. The plant consists of six principal buildings, all functional in design and construction. They include a chlorine manufacturing building, machine shop, power house, caustic manufacturing building, administration building, and a combination employment office and gate house.



Rubber-Covered Basketballs, Volley and Soccer Balls Made by Pennsylvania Rubber Co.

Poll Shows Rayon Cord Preferred

The American Viscose Corp., 350 Fifth Ave., New York, N. Y., through the Graham Research Service, has conducted a nationwide survey on the question of rayon *vs.* cotton cords in tires. The survey, embracing the opinions of 1,389 motorists, was representative as to geographic area, sizes of cities, makes of cars owned, and age and economic status of the people interviewed. The results of the poll, of considerable interest to those concerned in the manufacture and sale of tires, show that 55% of the people prefer rayon cord in their tires, 17% favor cotton, and the remaining 28% are undecided.

While the overall sentiment was three to one in favor of rayon, the opinion among men was four to one. It is significant that of those preferring rayon, almost 85% did so for reasons of greater strength and wearing qualities, the most characteristic properties of rayon. The survey showed a high percentage of awareness as to the purpose of the cord carcass in a tire. In answering the question, "Which construction features do you consider most important?" only 15% regarded the type of tread as most important; 34% thought the rubber composition should come first; while a total of 50% rated the type of cord or the number of plies as most decisive. This attitude would indicate the advisability of promoting tires with factual information on their inner construction, a factor underplayed in past tire promotion.

In the South, where favoritism for cotton might be expected, almost twice as many people preferred rayon. The figures were 25.3% for cotton, 49.7% for rayon, and 25% undecided.

Compared with the 85% who favored rayon for reasons of strength and wear, only 54% of the cotton advocates expressed their preference in these terms. Most of the remainder had no experience with rayon and based their preference on past satisfaction.

Among tire performance characteristics, 60% considered safety from blowouts as most important; 20% rated long mileage most desirable; 17% favored ability to stand hard usage, and 2% rated easy riding first. As might be expected, 72% of the women rated blowout resistance first in importance, probably because of the added difficulty women face in changing tires as well as the desire for personal safety.

Rubber-Covered Balls in Demand

According to Harry Rice, head of the athletic goods department of Pennsylvania Rubber Co., Jeannette, Pa., a subsidiary of General Tire & Rubber Co., Akron, O., enthusiasm for games of all kinds is greater than ever before in the history of the country because of the intense athletic program of the Armed Services during the war. Because of a shortage of leather during the war, the rubber-covered ball was used extensively in a wide variety of sports. During that time this type of ball proved not only that it had all of the desired characteristics of a leather ball, but also that it was markedly superior in long-wearing qualities.

The company's development and production men are now making available balls for all games which will make the sports accessible to all pocketbooks and add greatly to the life and performance qualities of all types of balls. Tests have proved that the rubberized ball, built to give long wear under the most unfavorable conditions, to retain its shape for the life of the ball, to resist wear, and to maintain the qualities of the original surface, is superior by far to the leather covered ball used largely because of tradition. The demand for these cheaper and longer lasting balls is growing rapidly, with the greatest needs for basketballs, footballs, soft balls, volley balls, and others made for water polo, squash, handball, soccer, beach and backyard games, and shuttlecocks for badminton.

Louis K. Braunston, recently resigned vice president and general manager of Miller Products Co., has organized his own company, Moldex Rubber & Plastics Corp., of which he is president, with executive offices at 1 E. 57th St., New York, N. Y., and branch offices in Akron, Kansas City, and Los Angeles. Associated with Mr. Braunston are Arche A. Mayers as vice president and George J. Wilson, plastics engineer. The Moldex corporation was created to serve the requirements of general industrial manufacturers who use molded and extruded rubber and plastic items, gaskets, and coated fabrics. Plants to serve the needs of the Moldex company and its customers are located in Akron, Ashtabula, and Bedford, all in O.; Newark, N. J.; Kansas City, Mo.; Buffalo, N. Y.; and New York.

Kabrich Now with Flintkote

Brigadier General W. C. Kabrich has joined The Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y., as assistant director of research stationed at the East Rutherford laboratory. Recently retired from the United States Army after nearly 30 years of service, General Kabrich has long been actively associated with chemical research, development, and engineering. During World War II, as Chief of the Technical Division, Office of the Chief of Chemical Warfare Service of the War Department, from 1942 until August, 1945, he was charged with the research, development, engineering for production, and actual initial procurement of all Chemical Warfare supplies for the U. S. Army.

General Kabrich was also chairman of the joint chemical warfare committee of the National Defense Research Committee, and chairman of the joint committee of the United States, United Kingdom and Canada on Chemical Warfare research and development. After termination of his duties in Washington during World War II, General Kabrich commanded the Pine Bluff Arsenal, one of the country's largest chemical arsenals, until he joined The Flintkote Co. early this year.

For his outstanding services in World War II, General Kabrich was awarded the Legion of Merit and was made a Commander of the Order of the British Empire. He is also a member of the American Chemical Society and the American Institute of Chemical Engineers and a graduate of the Virginia Polytechnic Institute, with a B.S. in mechanical engineering, and of the Massachusetts Institute of Technology, with an M.S. in chemical engineering practice.

War Assets Administration, Washington, D. C., on April 19 announced a single fixed price of 10c a gallon for surplus toluene, applicable to all users. This action was taken to accelerate the disposal of approximately 15,000,000 gallons (equivalent to nine months' normal supply) of toluene owned by the government. Predominately used in making lacquers, toluene is also used as a blending agent for motor fuel, an industrial solvent for the manufacture of artificial leather, printing inks, plastics, dry cleaning and the treatment of textiles. Some of it is used in the manufacture of rubber cement.

Among the surplus consumer goods offered last month by WAA in nationwide fixed price disposal sales were: 297,055 gallons of rubber vulcanizing cement, 489,000 pounds of tire cushion gum, 36,322 pounds of combination gum, 812,698 pounds of tire tread gum, 112,080 pounds of tire padding stock, 38,777 pounds of tire cord fabric, and 759,670 pairs of military goggles of various types.

John A. Roebling's Sons Co., Trenton, N. J., has signed as advertising manager Albert Neroni, formerly assistant advertising manager of Anaconda Wire & Cable Co., New York, N. Y.



New Gulf Passenger Tire

Gulf Tire & Supply Co., Gulf Bldg., Pittsburgh, Pa., has announced that new Gulf automobile and truck tires of an exclusive design and an extensive line of auto accessories are rapidly being placed on sale in service stations which distribute Gulf petroleum products. The new tire and accessory line includes inner tubes, storage batteries, fan belts, battery cables, tube repair kits, and others yet to be announced. In addition to passenger tires, heavy-service truck tires, snow tires, and off-the-road tires for contractors' and farmers' equipment will be introduced during the year. All tires are being manufactured of GR-S-10 synthetic rubber. The new passenger tire is particularly notable in design, having a new type of sidewall of exceptional resistance to cracking and bruising. The tread, flatter than the average tire is said to provide superior traction, less skidding, and increased mileage. Tested on taxi fleets, the Gulf tire showed a higher mileage than other makes, and a higher percentage of tires were satisfactory for recapping after the test. The inner tubes are made of Butyl.

Foster D. Snell, Inc., 305 Washington St., Brooklyn 1, N. Y., firm of consulting chemists and engineers, has announced that J. Mitchel Fain has rejoined its staff as account executive in charge of technical development for a group of manufacturers of chemical specialties. For the past four years Dr. Fain has been on a military leave of absence.

Westinghouse Electric International Co., foreign distributer for Westinghouse Electric Corp., Pittsburgh, Pa., to further plans for expanding export trade to Australia, the Orient, and western South America, has appointed R. H. MacGillivray regional supervisor of the Pacific Coast area, with headquarters in San Francisco, Calif. He has been with the Westinghouse organization since 1922.

Thermoid Advances Allen

Thermoid Co., Trenton, N. J., has elected Dwight P. Allen, executive vice president. Mr. Allen had been vice president and director of manufacturing operations and before that head of sales to car manufacturers.

"Our most acute problem is more production" said Fred Schluter, Thermoid president, "and Mr. Allen, with his knowledge of its importance and his prior sales experience, should relieve me of many management problems. We have five factories now and plan to build a large modern plant in the West. This expansion of our operations has brought too many burdens to the executive office to be carried by one man. Mr. Allen brings to the job experience, energy and fine leadership qualities."

Mr. Allen has been associated with Thermoid since October, 1934, and before that had been employed by Chrysler Motors in Detroit and as an engineer at the Wagner Electric Co., St. Louis.

Thermoid, furthermore has appointed H. C. Anderson, director of research. Mr. Anderson, a chemical engineering graduate of Iowa State College, was formerly with The Flintkote Co., Chrysler Corp., and Ford Motor Co., respectively, in research, engineering, and managerial capacities.

Robins Conveyors Inc., Passaic, N. J., a division of Hewitt Rubber Corp., Buffalo, N. Y., has announced that R. W. Eichenberger, vice president, has moved to the Chicago office to supervise sales in the western division. He succeeds J. F. Meissner, resigned. Mr. Eichenberger will be assisted by E. P. Larsen, a Robins sales engineer in the western division for several years. Mr. Eichenberger joined Robins in 1910 and has served in all phases of sales and engineering work. Recently in charge of engineering, he was located at the Passaic manufacturing headquarters.

Raybestos-Manhattan, Inc., Passaic, N. J., held its annual meeting April 2, at which President Sumner Simpson estimated 1946 sales at between $40,000,000 and $45,000,000, contrasting with 1945 sales of $51,600,000 and $25,400,000 in 1940.

The company has appointed The Republic Supply Co. of California distributer of Manhattan industrial rubber products. Republic Supply will be under the supervision of A. R. Bradshaw, Manhattan's Pacific Slope manager at San Francisco, and R. G. Hueman, Manhattan factory representative, will make his headquarters at Republic, which has 12 oil country field stores.

Manhattan Rubber Division, its entry selected as one of the most meritorious 1945 public relations performances, was awarded one of the first annual awards of the American Public Relations Association at its recent first annual convention. The award, made in the field of management, was received in Washington by J. J. De Mario, Manhattan's member of the public relations committee of The Rubber Manufacturers Association, Inc.

Plans New Financing

United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y., has filed a registration statement with the Securities & Exchange Commission with respect to $40,000,000 of 2½% debentures, due May 1, 1976. It is expected the debentures will be publicly offered in the near future by a banking group of 80 underwriters headed by and including Kuhn, Loeb & Co., New York.

Proceeds of the new issue will be added to the general funds of the company, and it is understood the funds will be used to provide additional working capital; to expand the company's business through development and acquisition of new lines of products and to provide facilities for manufacturing these products; to increase the capacity and to improve manufacturing methods and equipment of domestic and foreign plants engaged in the production of chemicals, textiles, rubber goods, and plastics; to construct or acquire additional domestic or foreign plants for the manufacture of such products; to construct new facilities for research and technical development work; and to rehabilitate and restore foreign plantation properties if and when repossessed.

If the company's plantation subsidiaries should recover possession of their properties in the Far East, it is probable that U. S. Rubber will find it necessary to replace damaged or destroyed machinery and equipment and to rehabilitate planted areas. A survey party sent to the Far East is scheduled to arrive in Singapore this month and is expected to report on the present condition of the plantation properties, to submit plans and cost estimates for rehabilitation, and to prepare estimates as to the cost of production in the future. The company at present has little reliable information as to the condition of the properties. It is informed that tapping has been started on some plantations in Malaya, including some of its estates. This work, however, is being done essentially as a local governmental enterprise.

Holds Annual Meeting

Sales of the company in the first quarter of 1946 were substantially above those in the corresponding period of any previous peacetime year, President Herbert E. Smith told stockholders at the annual meeting, April 16. Total value of production last year in more than 40 plants either owned or operated by the company throughout the world was more than $781,000,000, Mr. Smith reported. Of this amount, consolidated net sales from company owned plants accounted for $471,506,473, a new high. More than $310,000,000 worth of goods were produced in government owned plants.

During 1945 the company produced more than 162,000 tons of GR-S, Mr. Smith stated, and developed 45 new varieties of synthetic rubber, all on a production basis. The company's production of GR-S from the inception of the government's program in 1942 through 1945 totaled more than 374,000 tons, the largest output of any company.

Stockholders voted to increase the authorized common stock from 1,918,412 shares, $10 par value, to 2,500,000 shares in order to make additional shares available for issuance for expansion of operations. A decrease in the amount of authorized first preferred stock from 961,091 shares, $100 par value, to 651,091 shares, the number now outstanding, was also voted.

Stockholders also voted to extend the term of the company's managers shares plan until such time as it may be recalled by shareholders. All directors were reelected.

New Products Developed

Non-chipping, non-yellowing plastic enamel for refrigerators and kitchen appliances, a textile treatment to give fabrics a permanent "starch," and a moisture-proof coating for packaging and for shipping machine parts were announced by the Naugatuck Chemical Division. The new enamel is said to be well suited for such severe service applications as hair driers, which operate at high temperatures, kitchen equipment, where a highly glossy, non-yellowing white is required; and hospital equipment, which must be chipproof and chemically resistant. The enamel is applied by conventional methods and baked to an extremely durable finish. It is flexible, has high impact strength, superior hardness, high gloss, and a minimum discoloration upon exposure to light or heat.

Completely invisible on the fabric and unaffected by laundering and dry cleaning, the new textile treatment is said to give nurses' uniforms, women's summer dresses, sheets, and shirts a permanent "starchiness" under all weather conditions. The treatment, called Kandarizing, is said to be nontoxic, non-irritating, and will not tenderize the finest white broadcloth or most colorful chintz. Making use of a new synthetic resin, the treatment adds only 1½ to 2% to the original weight of the fabric. Applied during manufacture in the form of a water emulsion, the treatment lends itself readily to present textile processing equipment. It requires no cure and is unaffected by bleaching agents. Fabrics are immersed in the emulsion, squeezed, and dried at a temperature range of 212 to 250° F.

Kotol, the new plastic coating, has low moisture-vapor transmission, good elongation, and toughness, with a tensile strength of 900 p.s.i. The coating has a wide temperature range, with flexibility at −40° F. and good aging properties at 180° F. It is applied by spraying or dipping and is dried by air or by baking at 250° F. Its resistance to acid and alkaline plating solutions at high temperatures makes it valuable as a rack coating and stop-off lacquer in the electroplating industry. It also finds applications for sealing bottles and for packaging and shipping metal parts.

Utilizing experience gained during the war, the company's scientists have perfected a new geophysical wire which is said to weigh much less, yet have greater strength and flexibility than the prewar wire used on seismographic equipment in oil explorations. The new wire is made with a small-diameter conductor insulated by the company's unique dipping process, used during the war to make lightweight Army telephone wire. The saving in weight with the new wire is an important factor to geologists searching for new oil deposits as the equipment is often moved over rough terrain and is sometimes carried by hand.

Air cargo ranging from eggs to hardware can be dropped from a speeding plane without damage in a new rubber mail bag developed by U. S. Rubber. The bag, heavily reenforced to withstand severe punishment, may be picked up or dropped in small areas without a landing, thus bringing air mail service to places having either inadequate or no airport facilities. The bag, built with plies of rubber and fabric on the principle of an automobile tires, was developed for All-American Aviation, operator of airmail pickup routes in 118 small communities. Special equipment is used to pick up the mail bag from the ground. A loop, mounted on two vertical poles, is attached to one end of the bag. A hook trailing behind the plane catches on the loop and lifts the bag into the air; then it is pulled into the plane by an electrically powered reel.

Scientific farming and better facilities for the field and the farm home were presented as main features of the company's agriculture exhibit, "Science Serves the Farm," held in Chicago on April 1 to 6. Products shown covered a wide range of applications and included non-rubber as well as rubber items. Scientific research and the company's operating activities were highlighted in the "Hall of Science," a section of the exhibit devoted to testing and demonstrating materials and portraying product manufacturing operations. Here were shown the actual steps in the manufacture of Koylon, a light, foamy and extremely resilient rubber used for mattresses, upholstery, and cushioning. A series of processing steps for cotton revealed its treatment from the raw state to final finishing for use in tire cord, hose, belting, and numerous other applications. Other displays included in the Hall of Science were a series of interesting, comparative tests revealing the superiority of synthetic rubber inner tubes over those made of natural rubber, and examples of the company's EKKO process of electroforming. Other exhibits included many rubber and non-rubber products for the farm, and a series of displays on hunting, fishing, and other outdoor activities.

Appointments at Naugatuck

The appointment of F. Dudley Chittenden and George R. Vila as assistant development managers of the Naugatuck Chemical division, at Naugatuck, also was announced in April. Previously associated with the rubber company as technical coordinators, both men pioneered in the development and production of synthetic rubber and added materially to the initial success of the country's wartime synthetic rubber program.

Dr. Chittenden, a chemical engineer from Yale University, first joined U. S. Rubber in 1926 as a chemist at its general laboratories and served later in the same capacity at the company's general products plant in Providence, R. I. In 1942 he was transferred to Naugatuck Chemical to engage in synthetic rubber production. Then in 1943 he was named chief chemist for the

company operated synthetic rubber plant at Institute, W. Va., and later became its technical superintendent. In 1944, however, he returned to Naugatuck as a technical coordinator, subsequently being named factory manager of the Connecticut synthetic rubber plant, in which capacity he served until his current appointment.

Mr. Vila came to Naugatuck Chemical in 1936 as a technical sales representative specializing in rubber chemicals and acted in that capacity six years. Then he was transferred to synthetic rubber research and in 1943 became a technical coordinator for the synthetic rubber division in charge of research, development, and quality control. In late 1945 he went to Germany to investigate German research in the field of synthetic rubber as a member of a research group sponsored by the Office of Rubber Reserve. Born in Philadelphia in 1909, Mr. Vila received his A.B. degree in chemistry from Wesleyan University and his Master of Science degree in chemical engineering from the Massachusetts Institute of Technology.

Howard R. Gaetz has been made plant superintendent of the synthetic rubber plant operated by the company at Naugatuck, Conn. Associated with U. S. Rubber since 1942, Mr. Gaetz previously served as production superintendent of the company operated ordnance works at Williamsport, Pa., and Kankakee, Ill., the synthetic rubber plant at Institute, W. Va., and the Naugatuck synthetic rubber plant.

Two new technical representatives have been named for Dispersions Process, Inc., and Naugatuck Chemical, specializing in latex, Lotol, Dispersite, and other rubber dispersions: Clarence H. Sigler and Albert J. Marshall. Mr. Sigler, who will make his headquarters in Detroit and represent the company in the northern sales area, came to U. S. Rubber in 1942 on the technical staff of the ordnance works operated by the company at Williamsport, Pa., but in 1943 was transferred to Naugatuck Chemical at Naugatuck for research and development in aqueous dispersions and artificial latices. Mr. Marshall, with headquarters at 31 N. Summit St., Akron, O., will represent U. S. Rubber in Cincinnati, Dayton, Columbus, Indianapolis, and other cities in the central sales area. Prior to his 29 months in the U. S. Navy, from which he was recently released, Mr. Marshall had been Cincinnati branch manager for Continental Rubber Works, Erie, Pa.

H. Douglas Tate, entomologist, and Travis W. Brasfield, plant pathologist and mycologist, have joined the staff of the rubber company's agricultural experiment station at Bethany, Conn., according to George L. McNew, director of the U. S. Rubber agricultural laboratories. Both men will engage in research for new agricultural chemicals as well as continue the laboratory and field testing of insecticides, herbicides, and fungicides produced by Naugatuck Chemical.

Notes on Other Company Personnel

Coordination and direction of sales training activities in all sections of the company's tire division will be the responsibility of William F. Wrightnour, whose appointment as manager of sales training was announced last month by H. N. Hawkes, assistant general manager of the tire division. Mr. Wrightnour's headquarters will continue at the company's general offices, Rockefeller Center. In the tire business since 1928, Mr. Wrightnour first worked for a distributer and later owned and operated a tire agency with his brother in Scranton, Pa. Since his affiliation with U. S. Rubber in 1940, he has served as manager of budget sales, manager of business development, and merchandise manager of the U. S. Tires division. He was responsible for the initiation of the sales conference methods now used by the division.

Frank M. Urban has been named merchandise manager of the mechanical goods division. Born and educated in Chicago, he received his first sales experience while still in high school, working for Marshall Field & Co. His first full-time job was with the Forest Glen National Dairy Co., of Chicago, first as bookkeeper and later as assistant sales manager. Mr. Urban began his career with U. S. Rubber in 1929 as a salesman of mechanical goods in Chicago. Then in 1935 he became assistant sales manager in Chicago and four years later was transferred to the company's offices in New York. In 1944 was made assistant merchandise manager, the position he held at the time of his new appointment.

Ketchel F. Morlen, who has returned to U. S. Rubber after service as a lieutenant in the Navy, has been appointed Chicago district manager of the company's U. S. Tires division. Mr. Morlen served in the supply corps of the Navy and was later transferred to the Rubber Maintenance Section of the Bureau of Aeronautics. He was first employed by the rubber company in 1934 as a clerk in the operating department of the Detroit branch, but was sent to the Detroit plant in 1935 as a clerk in the tire engineering and service department and in 1936 represented that department in Kansas City. The following year he became assistant to the Kansas City district manager. Returning to Detroit in 1941, Mr. Morlen was assigned to the airplane tire division. With the advent of war, he became a special representative in the war products division. From 1943 until his enlistment in June, 1944, he was district manager of the Detroit plant.

Nine members of the company's technical staff have been cited by the Navy Department for exceptional service in ordnance development during the war: R. H. Gerke, Providence, R. I.; J. M. Mead, Naugatuck, Conn.; G. C. Holroyd, Hogansville, Ga.; E. T. Rainier, Detroit, Mich.; V. L. Burger, Passaic, N. J.; K. M. Webb, Bristol, R. I.; J. R. Wells, Mishawaka, Ind.; N. C. Tilley, Chicago, Ill., and Harold Weigold, Eau Claire, Wis. All were engaged in research and development at the company's shell-loading plant at Charlotte, N. C., and according to Rear Admiral G. F. Hussey's citation were given the awards for "development methods of loading bright tracer, dark tracer and dark ignition tracer for 40-mm. ammunition."

Besides the individual citations, there were organization citations for U. S. Rubber, the Charlotte plant, and the development department of the Charlotte plant, which plant achieved an enviable record for quantity-quality production of 40-mm. anti-aircraft shells during the war and as a result of savings made in operating costs saved the government more than $40,000,000 during its two years of existence.

Sheldon M. Fisher, for a number of years in the sale promotion and advertising department of U. S. Tires, in various capacities, has joined the New York staff of Campbell-Ewald Co., Inc., advertising agency, where he will act as a consultant on the U. S. Tires account for the agency in connection with distributer and dealer activities and will continue as supervising editor of the U. S. Royal Tires' monthly "Dealer News."

Howard H. McGee of New York, a salesman of rubber drug sundries and specialties, has been retired by U. S. Rubber after 30 years with the company and 47 years in the rubber industry. Mr. McGee started his career in 1899 with the Seamless Rubber Co., New Haven, Conn., and later was connected with the Davol Rubber Co., Providence, R. I., Ajax Rubber Co. of New York, Star Rubber Co., Akron, O., and finally, in 1916, United States Rubber Co. In recent years he specialized in the sale of physician and hospital supplies in the New York area.

Bicyclists may find it difficult to purchase tires and tubes for at least six more months, despite predictions for a record year of production by the bicycle tire industry, according to Noel M. Lanham, manager of the company's cycle tire department. Production of more than 9,000,000 bicycle tires and an equal or even greater amount of tubes during 1946 is the goal of the tire industry, but the demand is expected to exceed the supply until fall, at least. The tires and tubes of the future are expected to be even better than today's, said Mr. Lanham. Rayon will probably replace cotton cord in premium tires to result in a lighter, more resilient tire of equal length to the present tire, thus making pedaling an easier operation. Butyl tubes are also anticipated in the future. Production of bicycle tires has reached a record rate at the company's Indianapolis plant, which is now turning out 65% of the cycle tires manufactured by U. S. Rubber.

Many tire distributers are now considering new locations for their business establishments, reported A. G. Westlund, manager of the business development department, U. S. Tires division, in announcing publication of a booklet covering traffic habits, congestion, and the various factors in selecting a business location. Entitled "Selecting Your Location", the booklet is designed as a service to the independent distributers of U. S. tires. While it contains many detailed reports, one of its aims is to assist the tire merchant to analyze traffic statistics so that they will not become confusing or misleading. In addition the booklet discusses market potentials, locations in relation to community development, advertising value of a location, and many other pertinent topics. The location booklet was developed as the result of exhaustive field research conducted in prepa-

ration for the previously announced "U. S. Distributer Store Planning Manual", explained Mr. Westlund.

Fisk Division Activities

Several personnel appointments were made last month within the Fisk merchandising and business development departments. Albert N. Guy was named merchandise manager and has been succeeded as business development manager by James W. Green. Parvin F. Lee was appointed retail merchandising manager. William F. Beardsley was chosen to supervise budget merchandising plans, and Stanley M. White, the business management section. Howard E. Malcomb has been appointed Fisk district manager at San Francisco, succeeding Harry L. Rogers, elevated to manager of Fisk truck tire sales, Pacific Coast division. Mr. Rogers will now cover the Los Angeles, San Francisco, and Portland districts with headquarters at U. S. Rubber's Los Angeles plant.

Norvell S. Rose, independent tire distributer in Baton Rouge, La., was elected chairman of the Fisk Distributor Advisory Council for the coming year at the council's recent meeting in Chicago. Mr. Rose, who succeeds Claude C. Mason, Jr., Atlanta, Ga., is Louisiana state director of the National Association of Independent Tire Distributors and director of the National Institute of Treading Standards for Arkansas, Louisiana, and Mississippi. Council members participated with Fisk management representatives in discussions on budget merchandising, 1946 advertising plans, a store modernization program, and other plans and policies. Future possibilities in the tire business were reviewed by J. Chester Ray, Fisk sales manager.

A new model tire station for complete wheel servicing was unveiled at a series of three sales conferences conducted by the Fisk Tires division of U. S. Rubber, at which the details of a store modernization program were also announced. Preparing for the coming competitive market, Fisk held conferences in New York, Los Angeles, and Chicago for district managers and field sales personnel, which were conducted by J. Chester Ray, Fisk sales manager.

The modernization program, as described bv Mr. Guy, calls for a "family resemblance" between all Fisk tire stations for ready customer recognition. The new station, in Fisk's red and cream color scheme, is of modern, functional design and is planned for more efficient tire service, the expanding market, greater customer convenience, and better working conditions. The large type of station will contain a salesroom, multiple service bay areas, outside service and parking areas, recapping department, tire storage area, battery, storage area, offices, and customers' waiting lobby. Other small-type establishments will not contain so many departments, but will be equally efficient and have the same general interior and exterior appearance.

At the conferences, A. G. Richtmyer, manager of distribution planning, gave a presentation of Fisk's present and future distribution pattern and an analysis of individual markets in which direct distribution is eventually to be established. Off-the-road tires and their markets were discussed by H. I. Hess, merchandising manager. The New York conference, held at the Westchester Country Club, Rye, N. Y., was attended by personnel from the branch organizations at New York, Philadelphia, Pittsburgh, and Baltimore. Branches at Los Angeles, San Francisco, and Portland were represented at the Los Angeles meeting, held at the Hotel Ambassador. The Chicago conference, at the Hotel Sherman, was attended by representatives from the Chicago, Minneapolis, Detroit, Kansas City, Dallas, Atlanta, and Cincinnati branches.



Artist's Drawing of Model Fisk Service Station

Taylor Expanding Research

Taylor Instrument Cos., Rochester, N. Y., last month made N. B. Nichols director of its research division to succeed H. L. Mason, who resigned to accept the professorship of mechanical engineering at Iowa State College. Mr. Nichols has for the past four years been associated with the Radiation Laboratory, Cambridge, Mass., a subsidiary of the Massachusetts Institute of Technology, where he was in charge of a group that pioneered in developing numerous mechanisms required in automatic gunfire control. Before the war Mr. Nichols spent two years with the Taylor research division. After completing his undergraduate studies at Central Michigan College of Education, Mt. Pleasant, Mich., Mr. Nichols did three years of graduate work in physics at the University of Michigan.

Taylor's research department is undergoing considerable expansion. Two physicists, Carlton W. Miller, and William A. Mersman, both of the Radiation Laboratory, will come to Rochester soon after May 1. Walter G. Countryman, former U. S. Army captain, returns to the department after four years of military service.

The Taylor research division has for many years carried on industrial research and development, and it is the policy of the company to continue the expansion of this type of work. Mr. Nichols will accordingly be charged with the supervision of a large variety of scientific projects leading to the development of new products for use in both home and industry.



N. B. Nichols

Bakelite Corp., unit of Union Carbide & Carbon Corp., 300 Madison Ave., New York 17, N. Y., displayed a variety of new developments at the Packaging Exposition in Atlantic City, N. J., April 2 to 5. Among these new developments, which will feature widely in the packaging of consumer and industrial products, is a quickly sprayed, easily strippable coating based on Vinylite resins. This coating, now being used by the Navy to preserve ship equipment, should prove extremely useful in the future as a quickly applied, strong, and moisture-resistant package for all types of equipment from refrigerators to engines. Other new materials in Bakelite's exhibit were polyethylene film and Vinylite cast foils for wrappers and pressure-sensitive tapes, polystyrene and polyethylene plastics used for blown bottles, and special polyester styrene-type resins used for laminated signs. In addition to new developments, the exhibit also included displays of standard plastic packaging materials such as films and sheetings, adhesives, coatings, foils, and laminates.

Watson-Standard Co., Pittsburgh, Pa., has appointed Joesph M. Perrone director of research. For the past three years he had been doing research and development work on protective coatings at Mellon Institute of Industrial Research. During the war he had also been an instructor in plastics, protective coatings, and organic chemistry for Pennsylvania State College. Prior to his association with Mellon Institute, Mr. Perrone was with Stoner-Mudge, Inc. He is a graduate of Pennsylvania State College, where he received his Master of Science degree, and is a member of American Chemical Society, Pittsburgh Chemical Society, Pittsburgh Chemist Club, Society of Plastic Engineers, and Paint & Varnish Production Club.

Rewards Veteran Employes

Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J., awarded more than 100 employes who have served for 25 years or longer four-star gold emblems and granted them an additional week's vacation with pay at a luncheon in their honor on April 3 at the Raritan Valley Farms Inn. Quarter-century employes from the Bound Brook plant as well as from plants and offices in Newark, N. J., Providence, R. I., Chicago, Ill., Boston, Mass., and Damascus, Va., were invited guests. The Calco employes so honored represent but one group of some 398 members of the American Cyanamid family who have served the company 25 years or more and who are being similarly honored.

Employes who have served 10 years or more will also receive gold emblems as authorized by Cyanamid's president, W. B. Bell, in a letter to all employes of the American Cyanamid Co. and subsidiaries. According to Mr. Bell, no fewer than 3,537 employes have served continuously ten years or more. Of the total number, 1,189 are Calco personnel.

Arthur A. Rauchfuss has been appointed an assistant sales manager of the Calco Chemical Division, in charge of sales of dyestuffs and intermediates to the dry color manufacturers. Mr. Rauchfuss received his B.S. from the Polytechnic Institute of Brooklyn and in 1911 joined the Robert Gair Co., Brooklyn, remaining with that organization until 1918. During World War I he served with the Chemical Warfare Service as a civilian chemist, and in 1919 he became associated with the Calco organization, where he has been closely identified for many years with the development and sale of Calco products to the "Lake" trade.

Theodore G. Sullivan is president of the recently organized Sulco, Inc., 226 Orange Rd., Montclair, N. J., which will specialize in the production and sale of dispersed colors for rubber and plastics. Mr. Sullivan has been engaged in the color field for a number of years and is well known in the rubber industry.

Warwick Chemical Co., West Warwick, R. I., a subsidiary of Sun Chemical Corp., has opened a Philadelphia office at 29 N. Sixth St., which will represent all Warwick products in Pennsylvania, Maryland, Delaware, western New York, and most of New Jersey. D. S. Chamberlain, a vice president of the Warwick company, will be in charge of the new office, and working with him will be Max Lane and Kenneth Glace.

Mr. Glace recently was discharged from the Army with the rank of lieutenant colonel after five years with the Quartermaster Corps. Prior to entering military service Mr. Glace, a graduate chemical engineer from Lehigh University, had extensive experience in the textile industry and at one time was chief chemist for the R. K. Laros Silk Co., Bethlehem, Pa.

OHIO

Improved Products Announced

Last month the Goodyear Tire & Rubber Co., Akron, announced several new developments among its products, including the following.

Successful production of a high solids synthetic rubber latex was announced by L. B. Sebrell, director of the Goodyear research laboratory. The new synthetic latex, in addition to use in new products and improvements in old ones, is expected to end the shortages created by the lack of natural rubber latex. Furthermore the synthetic latex will probably find even larger uses than the natural material since its formula can be varied through a wide range to meet specific requirements. When GR-S rubber was developed, it was found that the latex thus formed was not suitable for use in the manufacture of dipped articles or for many of the other uses to which natural rubber latex had been put. Attempts made to thicken or cream the latex, as was formerly done with the natural material, were unsatisfactory, owing largely to the small size of the particles in the synthetic latex. Attempts were then made to alter the method of polymerization so that a latex of the desired thickness was produced in the first place. The method, as finally developed by Goodyear scientists, depends upon alterations in the proportion of styrene to butadiene, the use of a minimum amount of soap in making the emulsion, and the development of a new method of agitating or stirring the mixture during the process of polymerization. Dr. Sebrell pointed out that the use of synthetic latex in the manufacture of water emulsion paints is particularly important because of the increased washability imparted to the paints. Besides the use of latex in combination with other ingredients greatly increases the toughness of adhesives.

Goodyear's "Stretch-Wrap" machine, a new type of packaging machine adapted for the high-speed wrapping of a wide variety of regular or irregular shaped articles of varying sizes, was shown at the annual Packaging Exposition of the American Management Association in Atlantic City, N. J., April 2 to 5. The machine, invented by A. B. Clunan, manager of Pliofilm packaging sales for Goodyear, demonstrated its versatility by tightly wrapping individually in Pliofilm many objects ranging from chickens to hardware to cosmetics. The machine passes Pliofilm over electrically heated rollers and between two high-speed Airfoam belts which cushion the plasticized film tightly around surfaces of the object, at the same time forcing all air from within the formed enclosure. Designed so that the belts may travel at speeds up to 300 feet a minute, the machine is expected to be of great value in the vegetable field where speed in preparing vegetables for shipment in carload lots is essential. The machine is portable and can be used in the field wherever electrical power (110 volts) is available. It will also be of value in wrapping precision instruments which may be subject to rust or corrosion in shipment or in storage.



Goodyear's New Hi-Way Lug Tire

A new type of truck tire with special tread design to meet needs of vehicles operating both on and off highways has been put into production by Goodyear. Known as the Hi-Way Lug, the new tire has a deep, non-skid, extra-heavy tread plus a strong rayon cord body to provide the cut and bruise protection, in addition to traction and wearing qualities, needed by tires in logging, gravel operating, and coal mining. According to W. A. Kemmel, Goodyear's truck tire sales manager, the tire has lugs placed close together for smooth rolling and long, even tread wear. The alternate long and short bars provide extra traction for rough terrain. Specially compounded rubber toughens the tires against road shock and guards against separation and blowouts. Construction provides effective resistance to cutting, snagging, and bruising. Rayon cord is used, and the extra-heavy rayon breakers minimize shearing action between tread and carcass of the tire. Full production has been delayed somewhat by the recent steel strike which held up delivery of molds. First tires will be made available in the three sizes of 9.00, 10.00, and 11.00-20. Full production will not be reached until some time in June.

Sour crude oil of the vast West Texas fields, long considered the worst enemy of storage tank life, has been subdued by corrosion-resistant Resoweld, a Goodyear wartime development. These tanks, subjected to the corrosive effect

of the oil, have required frequent replacements, and different types of lining materials to combat this action have given varied success. Two years ago a number of tanks were lined with Resoweld. A recent inspection showed the plastic paint to be unaffected, and indications are that it will last longer than former linings. Despite its being designed for a specific job, new applications for Resoweld have been found in ceilings, beams, and other surfaces exposed to corrosive attack. The coating has exceptional resistance to acids, alkalies, and salt solutions and is insoluble in aliphatic solvents, water, and alcohol. New tests are revealing additional advantages, such as ability to prevent destruction of metal in oil storage tanks by electrolytic action. The protective paint may be applied by spraying, brushing, or dipping and can be satisfactorily bonded to metal, concrete and wood. Maximum efficiency in combatting corrosion, as well as maximum adhesion, is attained by baking the films. The film will not fracture at freezing temperatures and is unaffected by average atmospheric conditions. The product has found a definite place in industry where moderate corrosion resistance is desired, or where cost eliminates complete protection by rubber tank lining.

Mass production of 48,900 two-bedroom homes annually, if necessary materials and equipment are readily forthcoming, was promised by P. W. Litchfield, chairman of the board for Goodyear. Mr. Litchfield told Wilson Wyatt, Federal Housing Expediter, that Goodyear is ready to help relieve the veteran's housing shortage by utilizing idle war plants to manufacture the completely assembled homes at the rate of 157 a day. The houses will be built by Wingfoot Homes, Inc., Goodyear subsidiary. Peak production would be reached 90 days after installation of required plant equipment and receipt of priority building materials. The assembled homes would sell at the factory for under $2,500 and would be delivered complete with bathroom and kitchen fixtures, built-in beds, bureaus, closets, mirrors, and cabinets, ready for immediate occupancy.

The Wingfoot Home is 26 feet long and eight feet wide, permitting its delivery by truck over any highway in the country. Telescoped wings are pushed out at the delivery site to convert the house into a T-shaped unit 26 by 15 feet. A front porch and roof are attached as the house is moved on to its foundations, ready for sewage, water, gas, and electric connections. Application has been made to government agencies for the necessary materials to launch the building program, Mr. Litchfield said. A sample house was trucked from Arizona and put on display in Washington, D. C.

Located in places throughout the country where rubber-tired vehicles operate under the most hazardous conditions are metallic tires bearing the Goodyear trade mark. In appearance these tires closely resemble those of conventional type, but have a foundation of fine metal wire of high tensile strength firmly bonded with rubber. The tires are designed for heavy-duty service in such fields as logging and strip mining of coal and ore. Wire tires were developed during the war as a rubber conservation measure, and tests showed them to have greater strength and bruise resistance and to be less susceptible to cutting than conventional tires. Goodyear's method of constructing the wire tire consists of impregnating a layer of thin, high-tensile wire between two laminations of rubber. The first ply of rubber is placed on a building wheel, and rubber cement added to insure adhesion of the wire, which is then put on by an automatic device. Cement is then spread on the wire before a second lamination of rubber is added. The method of building from this point is much the same as that of constructing a cotton or rayon tire. Although the wire tire is not yet in volume production, Goodyear technicians are following with interest new developments that come out of the wire tire's day-by-day performance. Production schedules are under way that promise ultimate release of the tire for general use.

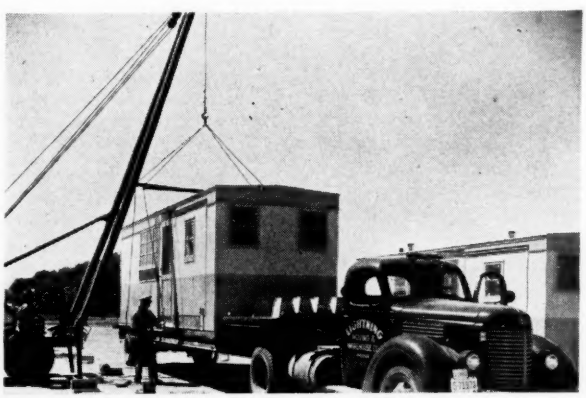
Personnel News

Appointment of F. R. Shaw as plant manager and S. S. Wrobleski as personnel manager for Goodyear's new mechanical goods manufacturing plant at Lincoln, Neb., has been announced by F. J. Carter, director of personnel for the company. The Lincoln plant, which will manufacture V-belts, drapers belts, and radiator and brake hose, is expected to commence production in early June. During the war both men were connected with the Goodyear Engineering Corp., which started and operated the government owned powder bag-loading plant at Charlestown, Ind. Veteran Goodyear employes, Mr. Shaw has 27 years' and Mr. Wrobleski 17 years' service with the company.

Return of 11 members of Goodyear's shoe products division from service with the Armed Forces and general expansion of sales personnel to meet increasing demands of both manufacturers and repairmen for the division's new product — Neolite — were announced by Harry L. Post, shoe products division manager. Discharged recently after two years with the AAF in India, Hugh J. O'Donnell, former jobber representative in Pittsburgh, Pa., has been assigned to the Akron staff as special contact man for the shoe repair trade. C. B. Marks, who also served as a jobber representative in New York prior to his 2½ years' army service, has been assigned the Philadelphia territory. Among promotional salesmen who have concluded their careers with the Armed Forces and are now back at their civilian posts are: P. T. Delmar and Alfred Pomiecka, Pittsburgh; Robert Merchant, Boston; A. R. Harting, Oklahoma City; Charles Heacock, Cleveland; E. L. Krieger, New York; D. B. Michell, Wilkes Barre; W. E. Swan, Detroit; and W. W. Young, Indianapolis.

Two War Department citations in "appreciation for patriotic service in position of trust and responsibility" have been received by R. T. Brown, who from 1940 through September, 1945, served as manager military products engineering for the Goodyear company. Citations were made for engineering and managerial advice to chief of Ordnance as a member, subcommittee on rubber products, SAE Ordnance Advisory Committee, and for outstanding services rendered in time of war to the tank and motor transport development program of the Ordnance Department. Mr. Brown is currently administrator technical operations for Goodyear. He is also a member of BIAE, American Society of Automotive Engineers, and Army Ordnance Rubber Advisory Committee. He has been with Goodyear 27 years.

Speaking before the Association of National Advertisers last month, Vernon H. Jones, director of Goodyear's visual merchandising laboratories and manager of the store planning and display department, stressed the need of coordinated marketing planning and teamwork between manufacturer and retailer. Such a program should provide proper store planning, with good functional layout and design making the most of existing space and providing maximum display facilities. In addition there should be proper displays with scientific merchandise arrangements that are keyed to consumer demand and have visual appeal. Emphasizing the practicability of such a coordinated program, Mr. Jones discussed the work of Goodyear's visual merchandising laboratories as an example, showing the value of their activities in specific instances to retailers desiring to improve or expand their facilities and marketing programs.



Goodyear's Wingfoot Home Being Unloaded; Bedroom Wings Are Telescoped in during Transit

Timken Advances Several

Walter F. Green has been promoted to assistant manager of the Timken Roller Bearing Co's division of research and development; while Joseph M. Roshong has been named superintendent of the division, and Harley J. Urbach has been appointed works engineer, taking over the former duties of Mr. Green.

The latter started with Timken in January, 1935, as a tool designer in the former experimental department. Later transferred to the works engineering department as a machine designer, in May, 1941, Mr. Green was made assistant to C. M. Maratta, chief works engineer, and held that position until his present appointment. He received his education at the University of Cincinnati and is a member of the American Society of Mechanical Engineers.

Mr. Roshong joined the company in February, 1923, in the engineering department and in 1935 began working in the former experimental department.

Mr. Urbach came to Timken in August, 1933, after being graduated from the University of Nebraska. Starting in the railroad engineering department, he later was transferred to the fuel injection equipment division of the engineering department. In 1940, Mr. Urbach was transferred to the works engineering department. He is a member of the Society of Automotive Engineers.

F. R. MacFadyen has been transferred from the Milwaukee office to the engineering department at Timken headquarters in Canton as industrial engineer in which capacity he will act as assistant to S. M. Weckstein and Paul Haager. A graduate of Cornell University in 1935, Mr. MacFadyen began working for the company that same year and spent 2½ years in the industrial sales training program. He then was sent to the company's St. Louis office as industrial sales engineer and later served in the Houston office in the same capacity. During the war Mr. MacFadyen assisted in the plant expansion program at Canton. He also is a member of the A.S.M.E.

New Hall Vice President

The C. P. Hall Co., Akron, has announced the promotion of Thomas L. Stevens to vice presidency as of April 15. Mr. Stevens, a member of the chemical concern for 16 years, was chosen to fill the vacancy resulting from the death of Arthur E. Warner on April 3rd. Mr. Warner had been vice president since 1936.

A graduate of Akron University, Mr. Stevens began his career in the rubber industry with the Firestone Tire & Rubber Co. in 1927. Three years later he joined the Hall organization, first as warehouse manager and then as a sales representative. Mr. Stevens now is vice president of a chemical manufacturing firm which serves the rubber industry on a nation-wide scale through the home office in Akron and affiliated C. P. Hall companies in Chicago and Los Angeles. He is a past chairman of the Akron Rubber Group, and a member of the Akron City and Fairlawn Country clubs.



Firestone XR-9B Light-Weight Helicopter

Firestone Tire & Rubber Co., Akron, is redeeming, through operation of the sinking fund, $1,375,000 of 20-Year 3% debentures, due May 1, 1961, on May 1, 1946, at 100¾% of the principal thereof together with accrued interest to May 1, 1946.

The XR-9B, the first lightweight helicopter to meet AAF military requirements for speed, maneuverability, and easy maintenance, was developed and produced, in cooperation with the AAF's Air Technical Service Command, by G & A Aircraft, Inc., Willow Grove, Pa., a subsidiary of the Firestone and a successor to the famous Pitcairn autogiro organization. Newest aircraft to be removed from the wartime secrecy list, the helicopter has already earned a reputation as one of the smoothest flying types ever tested at Wright Field's experimental center. The controls and instruments are so simple and responsive that Lt. Col. K. S. Wilson, chief of Wright Field's rotary wing section, recently stated that he believes that anyone can be taught to fly this helicopter in 10 hours or less. Although maximum flight performance characteristics have not yet been revealed, it is known that the XR-9B has flown faster than 100 m.p.h. Weighing less than half as much as a new Ford car, the helicopter is easy on the controls, free from the jolting vibration that has long plagued other helicopter designs, and easier and simpler to repair than other designs. Preliminary performance data indicate that the XR-9B will cruise at approximately 80 m.p.h., have a service ceiling over 10,000 feet, and a rate of climb of more than 1,000 feet a minute. Postwar modification of the helicopter has led to enlargement of the cabin and to other changes that, despite its light weight, put it into the general-purpose class. It will be able to fly taxi service from city centers to commercial airports, refuel isolated CAA airway beacons, rescue survivors from life rafts, dust crops, and fly forest patrol.

Seiberling Rubber Co., Akron, at its recent annual shareholders' meeting elected to the directorate to succeed W. A. M. Vaughan, who resigned from the board last year because of ill health, R. J. Thomas, vice president and treasurer of the company. At the same time the stockholders approved a retirement plan for salaried employes who reach the age of 65, to become effective after July 1. This retirement plan, similar to that in other rubber companies, will affect several hundred Seiberling employes.

Two Vice Presidents Named

Appointment of William I. Burt as vice president - manufacturing and Frank K. Schoenfeld as vice president-technical, B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, was announced last month by W. S. Richardson, president.

Mr. Burt, formerly general manager of plants, has been with the B. F. Goodrich Co., Akron, since 1927. Early in his career he was made manager of the chemical plant in Akron, and later assumed direction of all manufacturing for the chemical company. Long association with plastics, synthetic rubber, and chemical production led to Mr. Burt's appointment during World War II to the engineering design committee of the Rubber Reserve Corp. for construction and operation of government synthetic rubber plants, three of which Goodrich Chemical is operating. The new vice president is a member of the American Chemical Society and a counsellor of the American Institute of Engineering. He is a graduate of Ohio State University in chemical engineering.

Dr. Schoenfeld was formerly technical director for the chemical company and has also been with B. F. Goodrich since 1927. He was in charge of polymer research and technical manager of a manufacturing group prior to assuming direction of all technical operations and development including those of the three government synthetic rubber plants operated by the chemical company. Besides Dr. Schoenfeld will be in charge of the new semi-works plant now under construction, at Avon Lake, O., near Cleveland. A graduate in chemical engineering from the University of Michigan, Dr. Schoenfeld received his doctor's degree in chemistry from Western Reserve University. He belongs to the A. C. S. and the Institute of Chemical Engineering.

Goodrich Personnel Changes

The B. F. Goodrich Co., Akron, last month made the following announcements regarding company personnel.

The wartime switch to synthetic rubber in auto tires has not interrupted the almost unparalleled record of better performance at lower price which has long characterized the American rubber industry, said President John L. Collyer at the company's annual stockholders' meeting on April 16. Today's synthetic passenger-car tire, declared Mr. Collyer, contains half again as much material as its natural rubber predecessor of 25 years ago and gives nearly 2½ times the mileage, yet costs the consumer about one-third less. Mr. Collyer also reported to stockholders on the expansion of the company's sales activities and establishment of manufacturing connections in foreign countries, a new division, the International B. F. Goodrich Co., having been formed to administer that work.

At the meeting four directors, Thomas McInnerney, Wesson Seyburn, Langbourne Williams, Jr., and Sir Walrond Sinclair, were elected for new terms of three years each.

M. G. Huntington has been named assistant general manager of the asso-

ciated tire line sales division, succeeding Chester E. Carroll, promoted to division general manager, following the recent retirement of Harry E. Keller. The division merchandises Brunswick, Diamond, Hood, and Miller tires, tubes, and accessories. Mr. Huntington started with Goodrich in 1923 after studying business administration at the University of Minnesota and has handled many sales, advertising, and sales promotion assignments.

Two changes in the field organization of Goodrich's industrial products sales division were made last month. C. M. Christensen, Denver district manager since 1941, is now special mining representative in the Rocky Mountain area; while John S. Gulledge, St. Louis district manager before he entered the service on April 1, 1942, has been named acting district manager at Denver.

Walter J. Haecker, formerly general supervisor for the Pittsburgh district, has been made manager of the Jacksonville, Fla., district of the tire replacement sales division, succeeding the late Dewitt B. Hosman. An alumnus of Notre Dame University, Mr. Haecker signed with Goodrich in 1926 and held several responsible positions at various branches before his recent promotion.

Charles H. Kanavel, with Goodrich since 1933, has been named district manager of the company's automotive, aviation, and government sales division with headquarters in Los Angeles, Calif., to succeed Joe E. Earll, resigned. Mr. Kanavel, formerly manager of the company's industrial tire and track department in Akron, joined Goodrich the year after he was graduated from Purdue. He has held various positions in the company's production, engineering, and development organizations, was assistant manager of government sales in Washington, D. C., and served as manager of war products department during the ermergency.

W. D. Jones has been made manager of the industrial tire and track division. A graduate of Yale University, with the company since 1942 as a sales engineer on rubber tracks, Mr. Jones succeeds Mr. Kanavel.

Harry N. Roberts, recently returned from the Navy, has been appointed manager of battery and spark plug sales, to succeed T. H. Clarke, assigned other duties. A graduate of the University of Pittsburgh, Mr. Roberts joined Goodrich as a wholesale salesman in the Cleveland district in 1935, became wholesale sales supervisor in 1939, general sales supervisor in 1941, and in 1942 was transferred to the truck tire sales department in Akron, from which he went into naval service in 1943.

Wm. M. Stewart has rejoined the staff of the International B. F. Goodrich Co., Goodrich's export division, after nearly four years as an officer in the U. S. Navy. Mr. Stewart, a graduate of Wake Forest College, joined the company's export division in 1936.

Recognition of the retailer as an effective critic of the manufacturer's advertising designed to help sell retail goods has been advanced through a novel druggists' sundries ad-rating contest sponsored by Goodrich, according to the contest judges, Robert L. Swain, John W. McPherrin, and Godfrey M. Lebar, editors, respectively, of *Drug Topics*, *American Druggist*, and *Chain Store Age*.. The contest, which drew 8,729 entries from drugstore owners and employes in all parts of the country, also emphasized the importance of the "news angle" in advertising. The ads most consistenly given top rating were those which presented the most novel and interest-compelling subject matter. Entrants in the contest attempted to rate 12 Goodrich drug sundries advertisements in the same order of preference given them by 214 representative consumers in a secret advance survey conducted by Daniel Starch & Staff, New York, N. Y. Cash prizes totaling $1,500 were sent to 83 prize winners in all parts of the country, with the first prize of $500 going to a drugstore manager in Shreveport, La. The judges congratulated Clyde O. DeLong, Goodrich sundries sales manager, and Jay E. Miller, industrial products sales promotion and advertising manager, upon the effectiveness of the contest. The advertisements used were similar in format and style to the industrial products advertising campaign for which Goodrich was awarded top honors by Associated Business Papers.

The top award for 1945 in the annual advertising competition of Associated Business Papers, an organization embracing 129 leading American trade publications, went to Goodrich last month for three representative ads in its industrial products developments campaign. They were prepared by the Griswold-Eshleman Co., Cleveland. This is the fourth consecutive year that Goodrich has taken an award in this contest. Presentation was made to Jay E. Miller, advertising and sales promotion manager of the company's industrial products division, at a luncheon in the Hotel Biltmore, New York, N. Y.

Industrial tires made with a special synthetic rubber compound to resist the destructive action of oils, greases, and salt brine, as well as other severe service conditions, have been announced by Goodrich. The special compound can be furnished on industrial tires of all standard sizes, in both the Vulc-On and Pressed-On types manufactured by the company. In addition to resisting the action of oils, greases, and brines, the new compound has less rolling resistance than regular construction industrial tires made with either natural or GR-S rubber and has much more resistance to cutting and chipping.

The company is now supplying electrically heated rubber for the intake cowls of jet-propelled or jet-assisted airplanes. These rubber facings aid the engine cooling system by keeping ice away. According to James S. Pedler, manager of Goodrich's aeronautical division, the jet cowls direct the flow of air from the plane's leading edge over the starter, generator, and other engine accessories to keep them cool. Accumulations of ice in a cowl can stop this cooling flow of air as effectively as a woolen blanket, and the rubber linings for the insides of jet cowls were developed to meet this problem. In addition to preventing ice formation the facings also serve as effective anti-abrasion shoes.

Acquires New Factory

Continuing its program of expansion, The General Tire & Rubber Co., Akron, has leased a factory building with 18,000 square feet of floor space in Logansport, Ind., according to an announcement last month by William O'Neil, president. The Logansport plant will operate as a branch of the mechanical goods division of Wabash, Ind. Howard Dodge, head of the mechanical goods division, will supervise the Logansport operation. Glass run channels in which the windows in automobiles operate will be made at Logansport. Production was scheduled to start May 1, with 150 employes. This number is expected to reach 300 when the plant gets in full swing, according to Mr. Dodge.

General Tire's mechanical goods division is one of the chief suppliers of the automotive industry, in rubber parts for automobiles, and is also very active in the electric home appliance manufacturing field.

J. J. Wolverton has been appointed special representative in southeast Texas, according to Harry L. Whitesell, General's Houston branch manager. Mr. Wolverton was associated with The General Tire distributer in Port Arthur, Tex., before the war, but will now travel territory adjacent to Houston, where he is making his headquarters.

Wainright Made a Vice President

The Mansfield Tire & Rubber Co., Mansfield, on April 4 held the annual meeting of the board of directors at which G. W. Stephens was elected to his twenty-fourth year as president and general manager, and J. S. Wainwright was elevated to the new position of vice president in charge of sales. Mr. Wainright had been general sales manager of the company for 25 years. All other officers were reelected at the meeting. H. B. Soulen, vice president and factory manager; James H. Hoffman, secretary-treasurer; E. Paul Stephens, assistant secretary; and Edward E. Stephens, assistant treasurer.

President Stephens in his annual report to stockholders stated that a large portion of the company's $3,000,000 expansion program is completed. Major parts in the expansion include a new five-story building, an extension of the present power facilities which more than doubles the previous production capacity, and the installation of machinery to increase the overall production rate.

Dayton Chemical Products Laboratories, 1150 W. 42nd St., Dayton, recently was formed by Stewart L. Brams, for the past seven years with the cement laboratory of the General Motors Inland Mfg. Division, Dayton, where he developed several products and processes in the adhesion field. The new concern will do consulting, research, and development in all fields of applied chemistry, especially on problems involving rubber adhesives, bonding rubber to metal and other materials, and adhesives and adhesion problems in general.

Stauffer Retires from American Anode; Yohe Its New President

Burton F. Stauffer, who started with the rubber industry in 1893, has retired as president and general manager of American Anode, Inc., affiliate of The B. F. Goodrich Co., both of Akron, it was announced last month by John L. Collyer, Goodrich president. Mr. Stauffer's successor is Robert V. Yohe, since January 1, 1945, vice president of the company, which makes and sells rubber and synthetic latices and latex products.

Dr. Yohe, a graduate of Drake University and of the University of Minnesota, joined Goodrich in 1931 as a research chemist, was named manager of the general chemical laboratories in 1936, and technical superintendent of the company's sundries, sponge rubber and latex products division in 1939. Named assistant director of synthetic rubber research in 1942, he also served as technical superintendent of the chemical division before being made manager of the synthetic rubber plant at Louisville, Ky., which the company operates for the government, from which assignment he went to the American Anode organization.

The retiring president began with Goodrich rolling bicycle tire wrappers, but after several months became personal messenger boy for B. G. Work, then works manager and later president of the company for many years. Then in 1896, Mr. Stauffer was made chief clerk in the sundries department and after two years, manager of sundries packaging, shipping and finished goods warehouses. He was promoted to assistant plant superintendent in 1917. His next appointment was assistant general superintendent of the industrial products division in 1925; then in 1933 he was named general manager of the Miller Rubber Co. division. Next he became assistant general manager of the industrial products sales division, in charge of Plant 4, in 1942, and was elected head of American Anode on January 1, 1944.

Gro-Cord Officers Elected

At its recent annual meeting, Gro-Cord Rubber Co., Lima, added two new members to the board of directors: Rodney P. Lien and Samuel K. Markman. Directors reelected for the ensuing year were John A. Campbell, William D. Rosenberger, F. W. Cook, Virgil M. Knisely, George H. Knostman, Lloyd F. Leatherman, Melvin C. Light, Kyle L. Menuez, Forest Moor, and Harold Smith.

Officers elected were: Mr. Cook, president; Mr. Menuez, general manager; Mr. Knisely, vice president and sales manager; Mr. Smith, vice president and assistant treasurer; Mr. Moor, secretary and treasurer; and Mr. Light, assistant secretary. Mr. Leatherman is production manager.

Gro-Cord Rubber Co., organized in 1920 by J. E. Grosjean, is celebrating its twenty-fifth anniversary. Principal products are corded and composition soles and heels and floor matting. Employes number 225, and, as disclosed at service pin award ceremonies recently, 42% have more than 10 years of service with the company.

The Dayton Rubber Mfg. Co., Dayton, recently held a special Welcome Home Banquet at the Van Cleve Hotel, Dayton, at which A. L. Freedlander, president and general manager of the company, greeted more than 175 World War II veterans returning to their jobs. The Dayton Rubber service flag showed 517 in the Armed Forces, with 17 gold stars.

More than 420 members of the Dayton Rubber Ten-Year Club were honored at the organization's first postwar banquet held recently in the Biltmore Hotel, Dayton. Organized March 12, 1937, with a membership of 147, the Club this year initiated 54 new members, and 15 members advanced from the 10- to 15-year group; while 20 were inducted into the 20-year division; 19 members went into the 25-year group, including Mr. Freedlander, who was welcomed into this senior section by Harry S. Mooradian, vice president in charge of production. The Dayton company was established in 1905.

M. S. Fetter, treasurer and director of Master Tire & Rubber Corp., Findlay, O., has been elected to membership in the Controllers Institute of America, 1 E. 42nd St., New York 17, N. Y.

MacGregor Golf, Inc., after 117 years in Dayton, recently moved to larger quarters at 4861 Spring Grove Ave., Cincinnati, where new streamlined manufacturing units will be installed, according to President Henry P. Cowen. New quarters comprise a block-long four-story structure having 150,000 square feet of floor space, representing an investment of $1,000,000, including new machinery and equipment. An entirely new manufacturing unit for making golf balls is being set up under the supervision of C. C. Ryden, a veteran in golf ball production.

MIDWEST

Electric Industrial Truck Association, Chicago, Ill., has announced that results of its recent survey show that rubber and rubber goods manufacturers rank twelfth among the nation's private industrial users of electric industrial trucks. In the rubber industry 717 trucks were in use in 61 plants as of December 31, 1945, an average of about 11 trucks per plant. The survey also revealed that some 5,000 plants of all types, excluding government owned or operated facilities, were using 34,802 electric trucks as of that date to solve their material-handling problem. Versatility of electric trucks in handling different kinds of materials and finished products, low operating and maintenance costs, ready availability, plus the fact that battery-powered equipment can be of spark-enclosed construction to minimize fume and fire hazards, are cited as the basic reasons for electric trucks being specified by the rubber industry.

Names Two New Officers

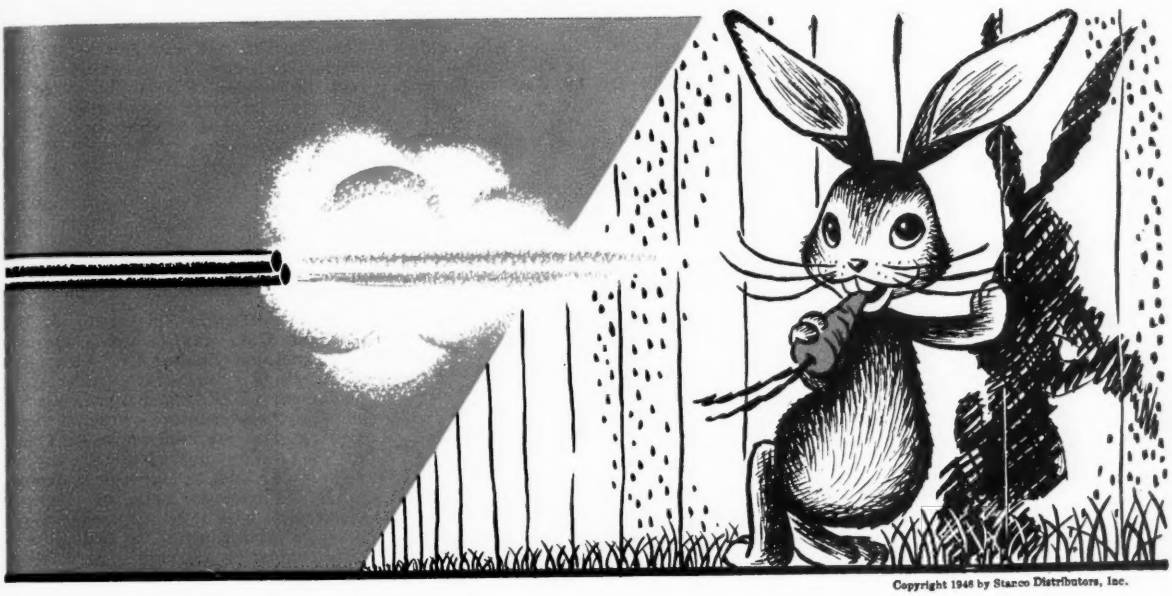
Lake Shore Tire & Rubber Co., Des Moines 6, Iowa, last month elected Charles K. Novotny vice president and William C. Waggoner treasurer. Mr. Novotny, who will continue also with his former duties of factory manager, has been with the company since early 1945. He spent the 15 years prior to that time in the manufacturing and research fields of the rubber industry. For several years he was stationed in Liberia, West Africa, in connection with the operation of a rubber plantation. Subsequently he was with Firestone Tire & Rubber Co., Akron, O., and then Mansfield Rubber & Tire Co., Mansfield, O., engaged in research and manufacturing activities. The new Lake Shore vice president is also a graduate of Oberlin College and holds a master's degree in chemical engineering.

Mr. Waggoner retains his former post of comptroller and had several years' experience in accounting before joining Lake Shore in 1944. A graduate of the University of Illinois, he is also a C.P.A. and a member of the American Institute of Accountants.

Monsanto Announcements

Monsanto Chemical Co., St. Louis 4, Mo., held its annual shareholders' meeting on March 26. As recommended by the directors, stockholders authorized 500,000 shares of preference shares and an increase in the authorized common stock to 2,000,000 shares. Of the new preference stock, 316,967 shares will soon be offered to common shareholders. Proceeds of the offering will be used to retire the 210,000 shares of preferred stock now outstanding at a cost of $22,675,000, excluding accrued dividends, and to meet in part the costs of expansion. Stockholders also reelected corporate officers and directors and returned to the board L. F. Nickell, of London, managing director of Monsanto Chemicals, Ltd.

Monsanto has announced that its scientists have reformulated a 66-year-old German chemical reported to produce the most versatile, efficient, and long-lasting textile preservative known to man. When properly formulated and applied at textile mills to fabrics, the chemical affords durable protection against air-borne superficial and rotter-type fungi, as well as against soil-inhabiting organisms, thus greatly increasing the serviceability of domestic, industrial, agricultural, and military fabrics. The parent compound, copper 8-quinolinolate, was discovered by German chemists about 1880, but had no commercial use until Monsanto's investigation disclosed its potentialities as a fungicide. It will be marketed under the trade name of Milmer, and the company emphasizes that it is a preservative for mill application only. Water sprays, weather exposure, sunlight, and laundering appear to have little or no effect on its permanence as a textile preservative. It is free from objectionable odor, compatible with water repellent and fire retardant textile finishes, and has been found relatively free from skin irritation or toxicity to humans. Textiles treated with the



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Perbunan is an *engineering material controlled* carefully, *tested* strenuously. A material which fits the *specific service* demanded by a *definite* industry.

The two Perbunan compounds shown illustrate Perbunan's adaptability to the automotive field. These compounds, specifically made for automotive engineers, illustrate how an engineered material can be versatile, meeting the requirements of many other industries.

We've advertised these compound applications to the automotive industry. Take advantage of our automotive trade advertising, and of Perbunan quality, economy and versatility.

Stanco rubber technologists are ready to help with your tough problems. Don't hesitate to get in touch with the nearest Stanco Distributors Office.

COMPOUND NUMBER	8975-8	8975-9
Perbunan 26	85.0	85.0
GR-S	15.0	15.0
Zinc Oxide	5.0	5.0
Stearic Acid	0.5	0.5
S. R. F. Black	75.0	75.0
Santocure	3.0	3.0
Tetramethylthiuram Disulfide	3.0	3.0
Paraplex G-25	10.0	
Durez Resin 12687		10.0
Original Physical Properties Cured 60 minutes at 287 F		
Shore Hardness	52	67
Tensile psi	2310	2740
Elongation per cent	480	320
Modulus at 300 per cent Elongation psi	1540	2690
Compression Set 30 per cent Constant Deflection		
70 hrs at 212 F	16	33
70 hrs at 250 F	26	46
Ovenaged 70 hrs at 212 F		
Shore Hardness points change	+7	+3
Tensile psi	2520	2740
Elongation per cent	360	230
Aged ASTM Test Oil Number One—70 hrs at 300 F		
Shore Hardness points change	+6	+1
Volume Increase per cent	+5	+6
Tensile psi	1690	2330
Elongation per cent	360	220
Aged ASTM Test Oil Number Three—70 hrs at 300 F		
Shore Hardness points change	−10	−10
Volume Increase per cent	+48	+57
Tensile psi	1340	740
Elongation per cent	260	140
Low Temperature Properties		
ASTM Bend Test D736-43T O. K. at	−70F	−70F

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THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME



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chemical are colored a light greenish-yellow shade which is light stable and a usable pigment for items such as awnings, canopies, and upholstery materials. Where darker shades are desired, the color of the preservative can be readily masked. When properly formulated and mill-applied, the fungicide provides "rot-proofness" to textiles in intimate contact with the earth, such as sandbags and tarpaulins, mildew-proof textiles which only occasionally contact the ground, such as military and many domestic, industrial, and agricultural fabrics, and mildew- and weather-proof all coated fabrics, clothing materials, and other textiles.

Appointment of Donald Dunwody as assistant branch manager of its New York sales district was announced by Monsanto's phosphate division. The district, with headquarters in New York, embraces Pennsylvania, New-York, New Jersey, Maryland and the western part of Massachusetts and Connecticut. Mr. Dunwody was graduated in 1929 from the University of Georgia with A.B. and LL.B. degrees. He was in the sales department of the Swann Chemical Co. until its acquisition by Monsanto in 1935 and since then has been a resident salesman in New York. From April, 1942, until January, 1946, he was on leave with the U. S. Navy and held the rank of lieutenant commander at the time of his discharge.

Appointment of Paul G. Marsh as assistant production manager of Monsanto's organic chemicals division and the promotion of A. J. Pastene to succeed him as manager of the company's John F. Queeny plant in St. Louis, were also announced last month. In his new position, Mr. Marsh will assist B. E. Thomas and W. G. Krummrich, divisional production managers. A native of Kansas City, and a graduate of Washington University, he has been with Monsanto for 23 years. Mr. Pastene, a native of Boston, was educated at Massachusetts Institute of Technology and he entered the service of the company in 1927.

E. T. Stehlby, formerly manufacturing superintendent, was advanced to the new position of assistant plant manager of the John F. Queeny plant. At the same location Roy G. Hemminghaus, Walter Meyer, and J. W. McCrackin were named manufacturing superintendents. Mr. Stehlby was born in Brooklyn and received his chemical engineering degree from Columbia University. He started with Monsanto in 1917.

J. Kenneth Craver, of Monsanto's research staff at St. Louis, has been appointed coordinator of plasticizers and resins for the organic chemicals division. Mr. Craver, who has specialized in research work in plastics, plasticizers, and catalytic hydrogenations at Monsanto since 1938, will work as a group leader in the company's divisional development department coordinating operations of the research, production, and sales departments involving plasticizers and resins. A native of Jonesboro, Ill., Mr. Craver received his education at Murphysboro, Ill., schools, Southern Illinois Normal, and Syracuse University. He is a member of the American Chemical Society, Alpha Chi Sigma, and Mu Tau Pi. In 1943 he founded the Plastics Club of St. Louis.

Robert E. Holmes has been made divisional export manager for Monsanto at Everett, Mass. Holmes, who handled Merrimac sales in the Philadelphia area will be succeeded by Roy T. Cowing, salesman for Chicago, who will be replaced there by Ralph E. Nelson, formerly divisional export manager at Everett.

Safety Council Award

The National Safety Council, Inc., Chicago, Ill., recently presented its "Distinguished Service to Safety" award to the employes of the National Synthetic Rubber Corp., Louisville, Ky. As of February 1, this company had worked 456 days without a lost-time accident.

At the end of the first half of the safety contest, being conducted annually by the Rubber Section of the Council, the average frequency rate for all contestants was 9.72, an 11% decrease over the same period last year. Of the 60 contestants, 10 have not had a lost-time accident. The synthetic division has a frequency of 1.80, a reduction of 58% over the corresponding period last year.

The 1946 National Safety Congress and Exposition will be held in Chicago from October 7-11. The Stevens Hotel, which will house the exhibits, will be headquarters hotel. Meetings will also be held in the Blackstone Hotel and the Palmer House.

Midwest Rubber Reclaiming Co., East St. Louis, Ill., has sold through underwriters, the recently registered with the SEC issue of 40,000 shares of cumulative preferred stock and 31,110 shares of common stock, and the net amount of the proceeds of this sale, in excess of $2,225,000, is being spent in an enlargement of each of the company's plants, at East St. Louis and at Barberton, O. The company expects that this increase in its capacity will be completed about January 1, 1947, to result in at least a 50% rise in the amount of reclaimed rubber manufactured. As part of its financing program the company is now chartered in Delaware, replacing the previous charter as a Missouri corporation. No changes have been made, however, in officers or directors of other branches of management.

W. L. McKnight, president of Minnesota Mining & Mfg. Co., St. Paul, Minn., is one of seven smaller manufacturers elected to serve as governors of National Patent Council, Inc., 578 Broadway, Gary, Ind., and to lead a nationwide educational program in defense of the patent system.

CANADA

Dow Chemical Co. of Canada, Ltd., Sarnia, Ont., has appointed N. R. Crawford president. He previously had been manager of the styrene plant of Dow Chemical Co. in Los Angeles, Calif. In his new capacity Mr. Crawford will direct the company's Dominion expansion projects, including completion of a polystyrene plant in Ontario, expected to be in operation by September, with a monthly capacity of 500,000 pounds.

Dominion Rubber Activities

A sales office at 176 London St., W., Windsor, Ont., was opened recently by the Dominion Rubber Co., Ltd., Montreal, P. O., coincident with the appointment of D'Arcy F. McConvey as company representative there, representing the mechanical goods, tires, textiles, and rubber dispersions divisions. Mr. McConvey, who joined Dominion Rubber in 1941, was recently connected with the Ottawa branch, prior to joining which, he had served in the company's general development laboratories in Montreal. Later he acted as coordinator of civilian respirators production of the war products division of Dominion Rubber, and supervised contracts for inflatable rubber craft in relation to the R.C.A.F. Mr. McConvey is a graduate of the University of Toronto.

K. E. Pierce has been made general credit manager of Dominion Rubber. He came to the company in 1933 at Moncton, N. B., and after rising to the position of branch accountant there, was transferred to the head office in Montreal, where he held various positions in the treasurer's department leading to his recent appointment. Mr. Pierce served in the Royal Canadian Navy during the war, with the rank of lieutenant, Special Branch.

Production executives of the Canadi- and General Electric Co.'s Peterborough Works made a tour of inspection of the Dominion tire factory April 19. The visit was in the nature of an annual recognition by Canadian General Electric of the industry in which it has placed an installation of outstanding importance. Enlargement of the manufacturing facilities and the development of special machinery introduced for the first time in Canada in the Dominion factory will increase tremendously the rubber company's output of tire and inner tubes. The group visiting the plant was headed by S. O. Shields, production manager, and included J. Playford, L. Welsh, C. Lister, F. Jopling, R. Buchanan, and O. H. Boyd, sales manager of the C. G. E. Hamilton office. The party was received at the plant by A. W. Hopton, vice president and general manager of the tire division; J. A. Lucas, general sales manager; R. D. Ratz, factory manager; and A. C. Mackay, plant engineer.

James V. Hatch has been appointed manager of the leather shoe section of the footwear division of Dominion Rubber, to be stationed at the company's plant at St. Jerome, P. Q., headquarters of its leather shoe manufacture. Mr. Hatch entered the boot and shoe industry in 1923. In 1943, however, he joined the R.C.O.C., serving for three years as officer commanding the No. 1 Boot Rebuilding Plant, R.C.O.C., Montreal, with the rank of captain.



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An eastern rubber processor was using an ordinary petroleum product to process GR-S and natural rubber. Stocks were difficult to handle and he was troubled with surface bloom.

A Sun Engineer was called in and recommended one of the special processing aids, refined by Sun for the rubber industry.

A saving of 10% in natural rubber and Buna-S content of certain rubber products was made possible . . . blooming stopped. The Sun product also resulted in effective softening of the vulcanizate. Excessive use of softener was not required and loss in tensile strength was avoided.

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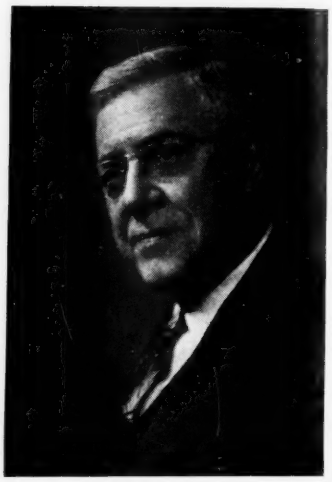
NEW ENGLAND

The H. O. Canfield Co., manufacturer of industrial rubber and synthetic rubber parts, Bridgeport, Conn., has opened a West Coast sales office, with H. G. Staley, returned veteran and former sales manager of a Midwest supply company, as West Coast sales manager. According to H. J. Donnelly, president of the Canfield company, Mr. Staley will personally direct contacts with manufacturers in the automotive, aviation, electrical, and plumbing industries as well as in air-conditioning, medical, drug, and sundry. He will acquaint all West Coast manufacturers whose products require rubber or synthetic rubber parts with the facilities and services available to them at the Canfield company.

Hood Rubber Co., Watertown, Mass., has named as vice president in charge of distribution James S. Barrie, who came to the company, now a subsidiary of The B. F. Goodrich Co., in 1924. He served as district manager and supervisor of footwear sales in St. Louis, Mo., his native city, and in Chicago, Ill. Since 1939 he was manager of distribution in charge of all footwear commercial activities and distribution.

Ralph B. Woodbury, purchasing agent for Hood Rubber, who retired on March 29 after long years of service in that position, was honored March 25 with a dinner at the Copley Plaza, Boston, Mass., where he was the guest of a large number of suppliers with whom he had long been doing business.

The Connecticut Hard Rubber Co., New Haven, Conn., according to President John Moffitt, is bringing to the electrical industry a new tape made by coating Fiberglas with Silastic, the Dow-Corning silicone rubber. The new tape has wide application in the electrical field because of its high dielectric properties, 1100 volts per mil, and its ability to retain this strength at temperatures up to 500° F. without breakdown or carbonization. It is said to be resistant to arcing and corona cutting and is waterproof and water repellent. The new product is marked under the trade name Cohrlastic, and distribution is now under way through electrical manufacturers, wholesalers, contractors, and dealers. It is available in rolls of various lengths, widths, and thicknesses. At present the demand is for 0.010- and 0.015-inch thicknesses as insulating wraps for underground cables, particularly at "hot spots." Cohrlastic is not sticky, and wraps are bound at the ends. Gaskets die-cut from the new material are used in fluorescent transformers and similar places where high dielectric strength is required at elevated temperatures.



William A. Gordon

Gordon Retires from Farrel

William A. Gordon has retired as product manager of the plastic extruder sales division of Farrel-Birmingham Co., Inc., Ansonia, Conn., and has taken up residence on his ranch property in California.

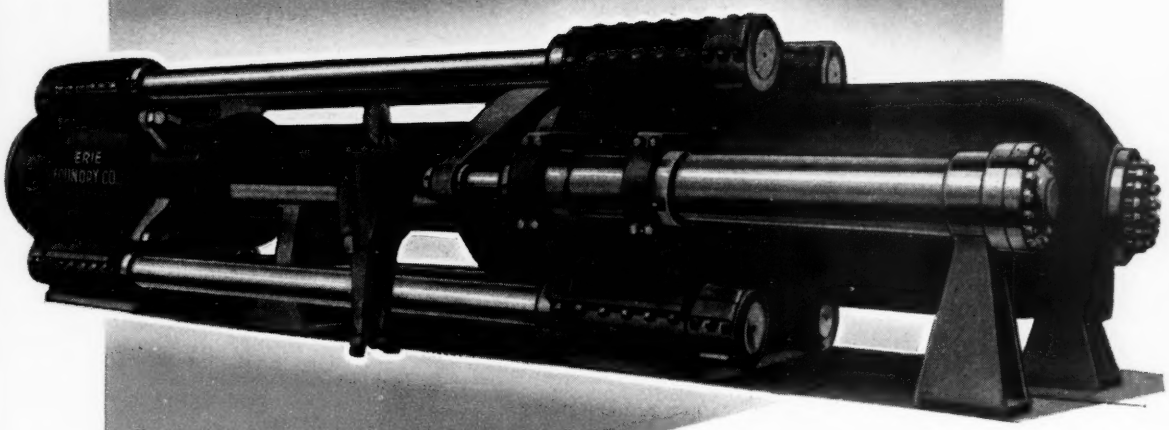
His connection with Farrel-Birmingham covered a period of more than 40 years, since it was not long after he received his mechanical engineering degree from Cornell University that he first entered the employ of Birmingham Iron Foundry, Derby, Conn., in 1904 as shop superintendent. Mr. Gordon was advanced to general superintendent in 1912 and placed in charge of engineering design in 1918, a position he held until shortly after Birmingham Iron Foundry merged with Farrel Foundry & Machine Co. of Ansonia in 1927. Mr. Gordon was elected a director of the newly formed Farrel-Birmingham Co., Inc., and took up the duties of development engineer, later becoming manager of the sales division of rubber and plastics extruding machinery.

During his career Mr. Gordon's inventive skill influenced the design of many machines built both at Birmingham Iron Foundry and in more recent years at Farrel-Birmingham. He not only accounted for improvements in standard equipment, but invented and developed new machines, including the Gordon plasticator.

Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass., has announced that Daniel B. Doherty, released from special duty with the Navy, has rejoined the carbon black manufacturer to serve on its technical sales staff. Mr. Doherty, who took his A.B. in chemistry at Harvard University in 1935, before the war was engaged in research in the Cabot laboratory on the use of carbon black in all its phases, compounding rubber, inks, paints, and lacquers. He entered the service in August, 1941, doing development and research work on protective coatings and corrosion resistance and specialized studies of electroplatings as applied to machine tools.



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Haartz-Mason-Grower Co., Watertown, Mass., has announced a change in corporate name to Haartz-Mason, Inc. (a Massachusetts corporation). Management, personnel, and location remain unchanged.

FINANCIAL

American Cyanamid Co., New York, N. Y., and subsidiaries. For 1945: net profit, $6,213,054, equal to $2.02 a common share, against $6,660,144, or $2.20 a share, in 1944.

American Viscose Corp., New York, N. Y. For 1945: net profit, $5,191,526, equal, after preferred dividends, to $2.32 a common share, compared with $5,129,940, or $2.28 a share, in the previous year; net sales, $119,375,886, against $108,483,400.

Anaconda Wire & Cable Co., New York, N. Y. For 1945: net profit, $646,324 equal to $1.53 a share, compared with $1,225,282, or $2.90 a share, in 1944.

Baldwin Locomotive Works, Philadelphia, Pa., and subsidiaries. For 1945: net income, $3,513,232, equal to $1.79 a share, contrasted with $5,264,465, or $3.81 a share, in 1944.

Brunswick-Balke-Collender Co., Chicago, Ill., and subsidiaries. First quarter, 1946: net income, $36,639, or 1¢ a common share, against $67,670 or 8¢ a share, in the 1945 quarter.

Crown Cork & Seal Co., Inc., Baltimore, Md. For 1945: net profit, $2,355,073, equal to $3.02 each, on 603,895 common shares, against $2,415,072, or $3.69 each, on 517,625 shares, in the preceding year.

First quarter, 1946; net income, $461,768, equal to 54¢ a share, compared with $601,180, or 92¢ a share; a year earlier.

Crown Cork International Corp., Baltimore, Md., and wholly owned domestic subsidiary. For 1945: net profit, $251,191, equal to $1.34 each on Class A shares, contrasted with $248,561, or $1.32 a share, in 1944.

De Vilbiss Co., Toledo, O. For 1945: net income, $468,432, equal to $4.43 each on 97,931 common shares, against $290,217, or $2.61 each on 97,970 shares, the year before.

Detroit Gasket & Mfg. Co., Detroit, Mich. For 1945: net profit, $354,501, equal to $1.51 a common share, contrasted with $453,658, or $1.91 a share, the year before.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Anaconda Wire & Cable Co.	Com.	$0.25	Apr. 22	Apr. 12
Baldwin Rubber Co.	Com.	0.175	Apr. 22	Apr. 15
Boston Woven Hose & Rubber Co.	Com.	0.50 q.	May 25	May 15
Collyer Insulated Wire Co.	Com.	0.30 q.	Apr. 1	Mar. 23
Crown Cork & Seal Co., Inc.	Pfd.	0.50 q.	June 15	May 24
Dayton Rubber Mfg. Co.	Com.	0.20	Apr. 25	Apr. 10
Dayton Rubber Mfg. Co.	"A"	0.50 q.	Apr. 25	Apr. 10
Detroit Gasket & Mfg. Co.	Com.	0.25	Apr. 25	Apr. 10
Detroit Gasket & Mfg. Co.	Pfd.	0.30 q.	June 1	May 15
DeVilbiss Co.	Pfd.	0.175 q.	Apr. 15	Mar. 30
General Cable Corp.	7% Pfd.	1.75 accum.	May 1	Apr. 19
General Tire & Rubber Co.	Com.	0.25 q.	May 31	May 21
Goodyear Tire & Rubber Co.	Pfd.	1.25 q.	June 15	May 15
Goodyear Tire & Rubber Co.	Com.	0.75 incr.	June 15	May 15
Hercules Powder Co.	Pfd.	1.25 q.	May 15	May 3
Johnson & Johnson	2% Pfd.	1.00 q.	May 1	Apr. 12
Lee Rubber & Tire Corp.	Com.	0.50 q.	May 1	Apr. 15
Raybestos Manhattan, Inc.	Com.	0.375	June 19	May 27
Thermoid Co.	Pfd.	0.625 q.	May 1	Apr. 25
Union Asbestos & Rubber Co.	Com.	0.175	July 2	June 10
United Elastic Co.	Com.	0.50	June 10	May 14
S. S. White Dental Mfg. Co.	Com.	0.35 q.	May 14	Apr. 29

Dow Chemical Co., Midland, Mich. Nine months ended February 28, 1946; net income, $5,425,500, equal to $3.61 a common share, compared with $6,172,376, or $4.61 a share, in the corresponding period a year ago.

Eagle Picher Co., Cincinnati, O., and subsidiaries. Year ended November 30, 1945: net income, $1,392,412, equal to $1.56 a share, contrasted with $1,259,299, or $1.38 a share, in the preceding year.

Flinkote Co., New York, N. Y., and subsidiaries. Twelve weeks to March 23, 1946: net income, $541,084, equal to 46c each on 1,033,921 common shares, against $641,698 (revised), or 60¢ each on 1,014,408 shares, in the like period last year; net sales, $10,034,842, against $8,517,673.

General Motors Corp., Detroit, Mich. For 1945: consolidated net income, $188,268,115, equal, after preferred dividends, to $4.07 a common share, contrasted with $170,995,865, or $3.68 a share, a year earlier.

Hercules Powder Co., Wilmington, Del. First quarter, 1946: net earnings, $1,751,253, against $1,467,611 in the same period of 1945; provision for taxes, $1,087,426, against $4,281,729.

Hewitt Rubber Corp., Buffalo, N. Y. For 1945: net profit, including seven months' operation of Robins Conveyors, Inc., $441,020, equal to $1.59 a share, against $519,985, or $3.09 a share, in 1944.

Master Tire & Rubber Corp., Findlay, O. For 1945: net income, $312,380, equal to $1.99 each on 156,721 common shares, contrasted with $300,845, or $1.92 a share, in the previous year.

Thiokol Corp., Trenton, N. J. For 1945: net loss, $13,827, compared with net profit of $11,996 in 1944; sales, $1,397,792, against $1,247,369.

Norwalk Tire & Rubber Co., Norwalk, Conn. Fourth quarter, 1945: net profit, $135,403, equal to 63¢ each on 202,230 common shares.

O'Sullivan Rubber Corp., Winchester, Va. For 1945: net income, $328,326, against $162,721 a year earlier; gross sales, less returns and allowances, $6,937,993, against $7,264,042.

Phillips Petroleum Co., Bartlesville, Okla., and subsidiaries. For 1945: net income, $22,571,509, or $4.59 each on 4,916,987 outstanding shares, against $20,952,088, or $4.26 a share in 1944.

Thermoid Co., Trenton, N. J., and subsidiaries. For 1945: net income, $475,194, equal to 63¢ a common share, contrasted with $754,565, or $1.11 a share, the year before.

The Timken Roller Bearing Co., Canton, O. For 1945: net income, $5,379,511, equal to $2.22 a common share, against $6,293,590, or $2.60 a share, in 1944.

Union Asbestos & Rubber Co., Chicago, Ill. For 1945: net profit, $537,429, against $585,662; in 1944 sales, $8,022,781, against $10,615,342.

U. S. Rubber Reclaiming Co., New York, N. Y. For 1945: net income, $223,176, against $51,222 a year earlier.

Improved Fatty Acid

The commercial availability of Palmalene, a palm fatty acid of medium titre, has been announced by the Beacon Co., Boston, Mass. This material represents a further refinement of a previous product of the same name, but is now more suitable for use in the rubber industry. The material is expected to fill a definite need in view of the present shortage of available fats. Palmalene's specifications include a saponification number of 180-185, an iodine number of 55-60, and a titre of 30.

Considerable

experience has accumulated in the use of these 2 rubber pigments

A considerable amount of actual plant experience has been gained in the use of Calcene T and Silene EF since these two compounding agents were introduced to the rubber industry. If you have not yet explored the interesting possibilities these two pigments offer your products, you should write today for information and free, working samples.

CALCENE T

Calcene T—A specially prepared, coated, precipitated calcium-carbonate product of extremely fine particle size—confers high tensile strength, resistance to tear and abrasion, low modulus, smooth, fast extrusion and good general processing properties to rubber stocks. A pigment of wide utility.

SILENE EF

Silene EF—The nearest approach to a "white carbon black." A white, finely divided, precipitated, hydrated calcium silicate—confers high modulus, hardness, tear resistance, and good tensile strength up to high loadings. Its use is constantly expanding for many synthetic and natural rubber products.

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Soda Ash • Caustic Soda • Liquid Chlorine • Sodium Bicarbonate • Pittchlor *(Calcium Hypochlorite)* • Silene EF *(Hydrated Calcium Silicate)* • Calcium Chloride • Soda Briquettes *(Iron Desulphurizer)* • Modified Sodas • Caustic Ash • Phosflake *(Bottle Washer)* • Calcene T *(Precipitated Calcium Carbonate)*

OBITUARY

Eugene H. Clapp

EUGENE H. CLAPP, vice president of New Jersey Rubber Co., Taunton, Mass., died suddenly at his home in Swampscott, Mass., March 18. Born in Boston, Mass., September 28, 1872, he attended the Boston English High School and Massachusetts Institute of Technology.

The son of the pioneer rubber reclaimer, Eugene H. Clapp, Sr., who founded the E. H. Clapp Rubber Co., E. H. Clapp, Jr., had been engaged in the rubber manufacturing business all his life. At the time of his death, Mr. Clapp was actively engaged in business as treasurer and a director of the New Jersey Rubber Co., Penobscot Chemical Fibre Co., a company founded by his father, and the Tilestone Hollingsworth Co., and was a director in several other firms.

Mr. Clapp was a member of the Algonquin, Eastern Yacht, Thursday, Brae-Burn Country, Tedesco Country, and The Country clubs. He also belonged to the Massachusetts Lodge AF & AL, Joseph Warren Commandery KT, Beacon Society, First Corps Cadets Veterans Association, and the Senior Golf Association.

Funeral services were held at the Old South Church, Boston, March 21.

Two sisters survive.

William J. O'Brien

WILLIAM J. O'BRIEN, rubber thread technologist and consultant, died at his home in West Haven, Conn., April 9. His entire business career of 55 years was spent in the rubber thread field.

Mr. O'Brien was born in Westchester, N. Y., August 7, 1863. He started work with the Easthampton Rubber Thread Co., Easthampton, Mass., as office boy in 1876 and rose to superintendent. Then in 1896 he founded the O'Brien Rubber Thread & Webbing Co. Later he spent some time in Russia and in 1911 joined The B. F. Goodrich Co., assisting in the development of the floating and all-tape golf balls. In 1921 the deceased designed the plant layout for the Chatham Mfg. Co. at Portland, Conn,. the first rubber thread plant to have a completely air conditioned mill room and thread finishing room. Mr. O'Brien was factory manager here until his retirement in 1931.

He is survived by his wife, a son, a sister, and a brother.

Funeral services were held in West Haven, with interment in Albany, N. Y.

Frank K. Starbird

AFTER a long illness Frank Kilburn Starbird, retired advertising manager of the Firestone Tire & Rubber Co., Akron, O., died in a hospital there on March 9. Funeral services were conducted March 12 from Westminster Presbyterian Church, Akron, followed by interment in Rose Hill Cemetery.

The deceased was first employed by Firestone in its advertising display department on March 9, 1916. Then in July, 1918, he was transferred to the western sales division and subsequently became manager of the pneumatic sales department. Later Mr. Starbird was made manager of the northwestern district with headquarters in Minneapolis, Minn., and in January, 1920, was promoted to the western sales managership, with headquarters in Akron. In July, 1928, he returned to the advertising department and in 1933 became advertising manager, a position he held until his retirement in 1942. He continued, however, as advertising counsel until his illness began last November.

Mr. Starbird was born November 27, 1886, in New London, O. He attended the local grade and high schools and Ohio State University.

He leaves his wife, a son, and two sisters.

Arthur E. Warner

ARTHUR E. WARNER, 64, vice president of the C. P. Hall Co., Akron, O., died at his home there on April 3 after a short illness. He had been associated with the chemical manufacturing company for 16 years and had been vice president since 1936.

Following his graduation from Buchtel College in 1903 with a B. S. degree, Mr. Warner joined The B. F. Goodrich Co. as assistant to the chief chemist. In 1907 he became chief chemist at the Pennsylvania Rubber Co. Two years later, however, he went to the Miller Rubber Co. as chief chemist. During his ten years with Miller he traveled in Malaya and the Dutch East Indies to study marketing and plantation work. He joined the Firestone Tire & Rubber Co. in 1919.

Mr. Warner belonged to the American Chemical Society and the Ohio Society of Licensed Professional Engineers, as well as the Akron University, Exchange, and Fairlawn Country Clubs. He was also a past chairman of the Akron Rubber Group and the Akron Section of the A.C.S.

Surving are the widow, one son, a daughter, a brother, and four grandchildren.

Funeral services were held April 5 in Akron. Burial was in Glendale Cemetery.

Foreign Trade Opportunities

(Continued from page 232)

John Dorr, 6a King Street, Kingston, Jamaica: footwear.

Mahus Bernstein, representing "AMPA", Ltd., 16 Petah Tiqva Rd., Tel-Aviv, Palestine: tires, radios.

Shaul Schneider, representing American Middle East Trading Co., 4 Hess St., Tel-Aviv, Palestine: plastics.

Ricardo Marciaq, Cuba Ave. and E. 40th St., representing Colon Motors Inc., both of Colon, Panama: automobile tires and accessories.

J. C. Valente Perfeito, representing Sociedade da Representacoes Pluribus, Ltda., 4 Largo do Ferreiro, Oporto, Portugal: tires and other rubber products.

C. C. M. Morgenstierne, Morgenstierne & Ofstad, A. S., Oslo, Norway: cables.

Henri Kaquet, 25 Rue Chaussee, Montegnee, Belgium: erasers.

Mohamed Said Hamid al Naqib, of Sayed Hamid al Haqib, Basra, Iraq: tires and pumps.

R. A. Mia, representing Sulliman Mia & Sons, 27 Commissioner St., Johannesburg, South Africa: plastic suspenders, combs.

Felix Enrique Echevarria, Gran Via 48, representing Auto Recambios-Echevvaria Hermanos, Alemeda de Recalde 70, both of Bilbao, Spain: automotive parts and accessories.

Esders (A la Grade Fabrique), 26 Rue de la Vierge Noire, Brussels, Belgium: rubber snow boots.

Asker & Co., 17½ Stora Nygatan, Goteborg, Sweden: rubber thread and rubber band.

Raoul Goossens-Devreux, Rue des Combattants, Wavre, Belgium: braces, elastic, suspenders, corsets.

Lines Bros., Ltd., Morden Rd., Merton, London S. W. 19, England: artificial leather cloth.

Antoine Scholer, 82 Rue de l'Acierie, Luxembourg, Luxembourg: corsets and girdles, elastic for suspenders, garters.

Carlos Schmied, of Carlos Schmied & Cia., Ltda., Alameda Santos 1362, Sao Paulo, Brazil: fountain pens, erasers.

Andre Ceurvorst, 264-276 Albert Cuipstraat, Amsterdam, Netherlands: tires, automotive accessories.

Grande Maison de Blanc S. A., 32 Rue du Marche aux Poulets, Brussels, Belgium: upholstery, decoration, and clothing materials, shoes, impregnated fabrics.

Surrey Trading Co., Ltd., 18 St. Mark's Hill, Surbiton, Surrey, England: artificial leather.

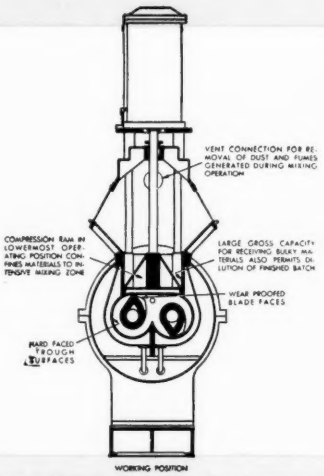
Rims Approved and Branded By the Tire & Rim Association, Inc.

Rim Size	Mar., 1946
15" & 16" D. C. Passenger	
16x4.00E	245,294
16x4.50E	208,179
15x5.00E	39,422
16x5.00E	8,388
16x5.00F	4,795
15x5.50F	10,650
16x5.50F	13,025
16x6.00F	4,089
16x4.00E-Hump	158,745
15x4.50E-Hump	52,797
15x5-K	9,881
16x5-K	6,838
16x5-½-K	26,687
15x6-L	429
16x6-L	2,072
17" & Over Passenger	
17x4.00F	114
Flat Base Truck	
17x4.33R	3,600
20x4.33R	57,626
15x5.00S	354
18x5.00S	2,571
20x5.00S	222,685
24x5.00S	1,212
18x6.00T	4,005
20x6.00T	29,513
22x6.00T	450
24x6.00T	1,033
20x7.00T	3,752
18x7.33V	17
20x7.33V	18,489
22x7.33V	8,945
24x7.33V	5,411
19x8.37V	319
24x8.37V	1,051
Tractor and Implement	
15x3.00D	7,806
19x3.00D	16,607
21x3.00D	2,713
17x3.25E	1,331
21x3.25E	1,083
20x4.50E	3,478
22x4.50E	1,713
20x5.50F	3,955
36x5.50R	278
24x6.00S	618
36x6.00S	1,470
20x8.00T	357
24x8.00T	3,348
W8-24	14,936
W8-28	264
W9-24	1,244
W10-28	5,215
W10-36	4,238
DW8-38	1,511
DW9-38	18,845
DW10-26	448
DW10-38	4,278
DW11-24	3,217
DW11-26	431
DW11-28	9,557
DW11-30	238
DW11-32	1,677
DW11-36	9,709
DW11-38	2,640
DW12-26	586
Earth Mover	
24x15.00	183
TOTAL	1,276,412

RAPID CHARGE AND DISCHARGE... One of the Outstanding Features of STRUTHERS WELLS

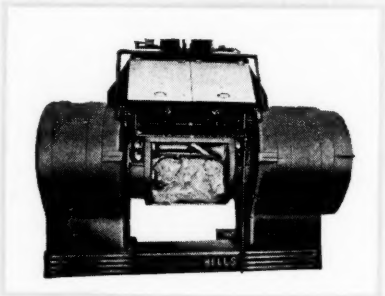
NORTHMASTER

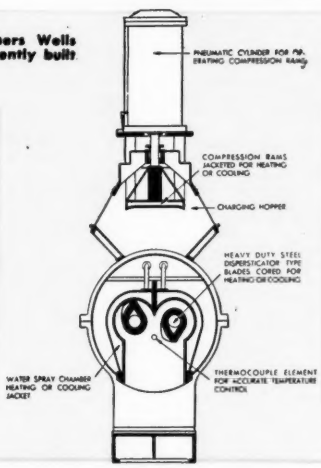
INTENSIVE MIXERS

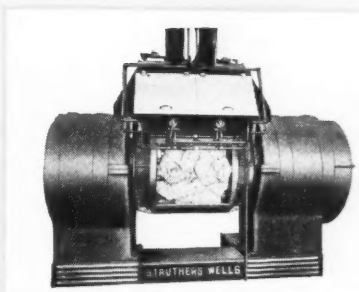


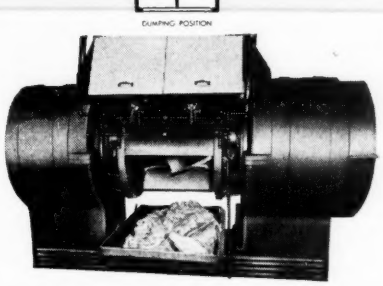


These are actual photographs of a Struthers Wells Northmaster Intensive Mixer which was recently built and installed for a large manufacturer.









Struthers Wells Northmaster Intensive Mixers are available in working capacity from 125 gallons to 400 gallons for · Pigment Dispersion · Rubber Cements and Dispersions · Mixing, Compounding, Dispersion, Processing all kinds of extremely heavy and tenacious materials requiring maximum strength, durability and efficiency. Mixers are constructed in accordance with ASME Code requirements, or with separate cooling nozzles. Trough heads are equipped with removable steel liners. Mixing Chamber walls are protected against excessive wear and contamination by the application of Steelite, Colmonoy or other hard facing materials best suited to the materials being processed.

Write today for descriptive, technical Bulletins.

STRUTHERS WELLS CORPORATION

***Northmaster Division*, Titusville, Penna.**

Plants at Titusville, Pa. and Warren, Pa.

Offices in Principal Cities

Patents and Trade Marks

APPLICATION

United States

2,391,906. **Inflatable Boat.** C. H. Kearny, United States Army.

2,391,907. **Track Shoes Having a Pin Passing through a Metallic Tube and Elastic Material Spacing the Pin from the Tube.** H. A. Knox, Washington, D. C.

2,391,959. **Sunbathing Apparel of Thin Flexible, Translucent, Thermoplastic Sheets Containing Ultra-Violet Light Filtering Agents.** G. Gallowhur, Reading, Vt.

2,391,986. **A Sheet of Rubber Having a Tacky Surface and a Protective Covering Consisting of a Plasticized Film of a Water-Soluble Polyvinyl Alcohol.** L. L. Leach, Swarthmore, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,392,085. **Spray Nozzle of a Rubber-Like Resilient Material.** C. B. Farrel, San Francisco, Calif.

2,392,108. **An Apparatus for Molding Laminated Structures, a Nozzle Member Having a Sealing, Bulbous Portion of Resilient Material and a Flange Portion of Resilient Material.** E. L. Vidal, Washington, D. C., and W. A. Taylor, Wildwood, N. J., assignors to Vidal Corp., a corporation of Del.

2,392,129. **In a Laminated Glass Closure Unit, a Layer of Organic Plastic between the Glass Plates, and Rubber Channeling about the Edges.** D. T. Downes, Creighton, assignor to Pittsburgh Plate Glass Co., Pittsburgh, both in Pa.

2,392,198. **Seal Assembly.** J. R. Snyder, assignor to Thompson Products, Inc., both of Cleveland, O.

2,392,279. **Pressured Fluid Displacement Mechanism Including an Elastic Body with a Fluid Cell Therein Adapted to Be Increased and Decreased Dimensionally in One Direction upon Elastic Deformation of the Body.** R. J. Woods, Grand Island, assignor to Bell Aircraft Corp., Buffalo, both in N. Y.

2,392,288. **A Field Reservoir for Liquids Including an Earth-Encompassed and Supported Cup-Like Sheet of Liquid-Impervious Material.** G. D. Marcy, Newton Highlands, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.

2,392,311. **In an Electrical Device, a Rigid Molded Casing of Insulating Material through Which Extends a Terminal Lead Partly Coated with Oil-Resistant Synthetic Rubber.** A. J. Christopher, Teaneck, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,392,315. **Elastic Member in a Footwear Pressing Apparatus.** H. L. Davis, Walpole, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,392,373. **Belt Having a Body of Rubber and Rubberized Fabric Shaped to Fit a Driving Pulley.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,392,377. **Wrinkle Restraining Device Including a Hollow, Elastic Suction Pad and Adhered thereto, a Body of Spongy, Rubber-Like Material.** S. Golding, New York, N. Y.

2,392,387. **In an Equilibrator Including an Open-End Cylinder in Which Is a Piston with Piston Rod extending through the Open End of the Cylinder, and a Jacket about the Open End also Surrounding Part of the Length of the Piston Rod Extending through the Open End of Material Secured to the Open End and the Jacket so as to Surround the Piston Rod.** J. F. Foy, Claremont, N. H.

2,392,388. **The Use of Polytetrafluorethylene to Insulate Armature Slots and Wire in the Manufacture of Electric Motors.** R. M. Joyce, Jr., Marshallton, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,392,521. **Printing Type Consisting of a Web of Two Joined Layers of Vulcanized Microporous Rubber Saturated with Ink.** R. G. Chollar, assignor to National Cash Register Co., both of Dayton, O.

2,392,562. **Resilient Wheel.** A. O. Williams, Battle Creek, Mich., assignor to Clark Equipment Co., Buchanan, Mich.

2,392,600. **Atomizer.** A. Limbach, Carmel, N. Y.

2,392,670. **Windshield Cleaner.** E. C. Horton, Hamburg, assignor to Trico Products Corp., Buffalo, both in N. Y.

2,392,712. **Warming Pad Including a Single Flexible Sheet-Like Heating Element Made of Electrical Resistance Material, in Which Conducting Members Are Embedded.** K. L. Woodman, Mansfield, O., assignor to Westinghouse Electric Corp., East Pittsburgh, Pa.

2,392,724. **Foundation Garment with Elastic Sections.** F. A. Cohen, Brooklyn, N. Y.

2,392,734. **In Bonding Non-Metallic Elements Together, the Use of a Thermoplastic Material in a Thin Sheet between the Ends of the Elements.** A. H. Haberstump, assignor to Murray Corp. of America, both of Detroit, Mich.

2,392,743. **High-Speed Flat Belt Including a Single Layer of Spirally Wound Tension Cords Formed from Two Spaced Groups, and a Single Layer of Transverse Cord, the Whole Being Cemented together with Rubber-Like Material.** H. J. Johnson, assignor to Gates Rubber Co., both of Denver, Colo.

2,392,790. **The Use of Polymerized and Monomeric Resins as Coating Materials in Making a Rigid Electrical Coil or Like Assembly.** J. K. Webb, London, England, assignor to International Standard Electric Corp., New York, N. Y.

2,392,902. **Fuel Tank Having a Covering Including a Sealing Layer of Unvulcanized Rubber and Oil-Resistant Synthetic Rubber-Like Material over Which Is a Compressive Layer of Vulcanized Rubber and Oil-Resistant Synthetic Rubber-Like Material.** R. A. Crawford, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,392,988. **Endless Track for Tractors, Tanks, Etc., Including Cable-Reenforced Rubber-Covered Belts.** H. F. Keck, assignor to Wingfoot Corp., both of Akron, O.

2,393,002-003. **Kidney Catheter.** M. L. Smith, Savannah, Ga.

2,393,005. **Ear Protector.** P. S. Veneklasen, Saugus, Mass., assignor to United States of America, represented by the Executive Secretary of the Office of Scientific Research and Development.

2,393,071. **Elements of Rubber-Like Material in a Mounting for Electrical Apparatus.** W. Schaelchlin, Forest Hills, assignor to Westinghouse Electric Corp., East Pittsburgh, both in Pa.

2,393,100. **In Forming Laminated Structures, the Use of Synthetic Resin Adhesive Mixed with Acetylene Black.** W. Gallay and G. G. Graham, assignors to Honorary Advisory Council for Scientific and Industrial Research, all of Ottawa, Ont., Canada.

2,393,111. **Ink Eradicator Reservoir and Applicator for Use with Fountain Pens.** S. Lehman, Madison, Wis.

2,393,161. **Cushion Tire.** F. L. Haushalter, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,393,171. **Hand Covering of Rubber-Like Material Having a Flexible Palmar Portion and Relatively Stiff Strip Bracing Means in the Palm.** C. P. Krupp, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,393,183. **Vehicle Suspension Including Rubber-Annulus Means.** G. H. Parker, Royal Oak, assignor to Chrysler Corp., Highland Park, both in Mich.

2,393,260. **Shaft Seal.** H. S. Pardee, Ravinia, assignor by mesne assignments to Acme Industrial Co., Chicago, both in Ill.

2,393,298. **Rubber Glove at Least Partly Coated with Porous Latex Rubber Providing a Rough, Non-Slip Surface.** W. W. DeLaney and C. J. Crowley, assignors, by mesne assignments to Seamless Rubber Co., all of New Haven, Conn.

2,393,322. **In a Closure Structure for a Container for the Expulsion of Its Contents by Air Pressure, a Closure Member of Flexible Resilient Material.** E. M. Houghton, Marion, assignor to Double Duty Products, Inc., Cleveland, both in O.

2,393,369. **Annular Cushion of Soft Rubber in a Resilient Axle Support.** J. M. Hait, San Gabriel, assignor to Food Machinery Corp., San Jose, both in Calif.

2,393,466. **Cable for Producing Magnetic Fields.** E. W. Greenfield, Hastings on Hudson, assignor to Anaconda Wire & Cable Co., New York, both in N. Y.

2,393,493. **Airplane Supporting Apparatus Including Tubular Telescoping Members and a Pneumatic Collapsible and Extensible Bellows Sealingly Engaging the Telescoping Members.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,496. **Reenforced Tubing Including an Inner Structure of Rubber or Rubber-Like Composition and an Outer Fabric Sheath Composed of Mono-Filaments Consisting Essentially of a Vinylidene Chloride Copolymer and a Plasticizer.** T. W. Stedman, New York, N. Y., assignor to Firestone Tire & Rubber Co., Akron, O.

2,393,499. **Lightweight "Bucket" Shape Airplane Pilots' Seat of Laminated Plywood.** H. C. Flint, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,505. **In a Mounting Having Two Relatively Movable Portions Including Two Inverted U-Shaped Members Placed One Within the Other, Rubber Means Bonded to the Parallel Leg Portions of the Members.** E. F. Riesing, Pontiac, Mich., assignor to Firestone Tire & Rubber Co., Akron, O.

2,393,523. **Thermohydrometer Including a Transparent Liquid Barrel Portion, Syringe Bulb, and Thermometer.** L. Edelman, Chicago, Ill.

2,393,533. **Water Goggles with Body and Face-Fitting Form Portions All Molded of the Same Material.** O. W. Heinz, Los Angeles, Calif.

2,393,578. **Container Closure Having a Hollow Cylindrical Body Open at One End, across Which Extends a Thin, Resilient Diaphragm of Elastic Material Capable of Being Easily Pierced by a Hypodermic Needle, Which Is Self-Sealing after Removal of the Needle.** R. B. Waite, Springville, N. Y., assignor, by mesne assignments, to Sterling Drug Inc., Wilmington, Del.

2,393,592. **Flexible Sleeve of Rubber-Like Material for Rubbing Machines.** S. A. Crosby, Chicago, Ill., assignor to Sterling Tool Products Co., a corporation of Ill.

2,393,612. **Girdle with an Abdominal Supporting Panel of Textile Fabric, to the Entire Area of Which Is United a Ply of Flexible Water-Insoluble Material with Rubber-Like Properties.** C. Bullinger, Downers Grove, assignor to A. Stein & Co., Chicago, both in Ill.

2,393,635. **Detachable Deicing Boot for Airplanes.** D. C. Hubbard, Centralia, Mo., assignor of 50% to R. H. Wendt, Chicago, Ill.

2,393,668. **Transparent Stencil Adapted for Use in Cutting Letters, Symbols, and Designs on a Surface by Means of Sandblasting and Including a Temporary Surface of Rubber and a Comminuted Colorless Base Material.** A. J. Wartha, assignor to Minnesota Mining & Mfg. Co., both of St. Paul, Minn.

2,393,721. **Resilient Vehicle Wheel.** A. H. Tracy, Sarasota, Fla.

2,393,751. **Dental Polishing Tools Having Cups of Flexible Rubber.** G. A. Chott, Chicago, assignor of one-half to H. J. Chott, Riverside, both in Ill.

2,393,843. **Composite Panel for Adhering to a Wall or Other Work Surface, Including a Front Finish Sheet of Synthetic Resin, a Back Sheet of Vulcanized Rubber and Ground Cork Having an Adhesive Receiving Rear Face, and between the Two Sheets, a Coating of Flexible and Elastic Rubber-Rosin Cement as Bonding Agent.** P. Van Cleef, assignor by mesne assignments to Van Cleef Bros., both of Chicago, Ill.

2,393,935. **Cable Joint between a Paper-Insulated Cable and a Rubber-Insulated Cable, Including Fibrous Tape Impregnated with a Mixture of Rubber and Polystyrene Wrapped Around the Connected Cables.** T. R. Scott, London, W.C.2, England, assignor to Federal Telephone & Radio Corp.

2,393,953. **Spinning Cot Including a Body of Rubber Composition throughout Which Fibers Extend.** H. M. Bacon, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,393,966. **In an Electrolytic Condenser Having a Container with Opening and an Electrode in the Container, a Soft Rubber Closure for the Container.** J. B. Brennan, Bratenahl, O.

2,394,063. **Protective Covering for Aircraft Surfaces, Etc.** W. H. Hunter, Lakewood, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,394,094. **Overflow Stopper for Sinks, etc., Including a Hollow Body Member of Flexible Material Open at Both Ends and Provided with a Vacuum Member at One End.** M. A. Nichol, New Wilmington, Pa.

2,394,106. **In a Vibration Absorbing Mount, a Primary Base Frame and a Secondary Load Carrying Frame on Which Are Mounted Cushions of Spongy Elastic Material.** C. S. Robinson, New York, N. Y.

2,394,139. **Key Operated Erasing Attachment for a Typewriter.** C. R. Bennett, East Cleveland, O.

2,394,154. **Fuel Tank Having as Lining a Bag of Self-Sealing Material.** W. H. Curtis, Los Angeles, Calif., and R. R. Curtis, assignors to Curtis Pump Co., both of Dayton, O.

2,394,168. **In a Monorail Tractor for Overhead Carrier Systems Including Supporting Wheels Which Ride on a Flange of a Rail of Such a System at Opposite Sides of a Vertical Web of the Rail, Cooperating Traction Wheels Having Compressible Tires.** G. F. Goga, Kenmore, N. Y.

2,394,290. **In Combination, a Wheel Having a Flange, a Pneumatic Tire Having a Bead Portion to Abut against the Flange, and Fluid Distensible Means between Flange and Tire Bead.** H. J. Butler, Sutton Coldfield, assignor to Dunlop Rubber Co., Ltd., London County, both in England.

2,394,351. **Rubber-like Packing Element in a Tube Coupling.** P. D. Wurzburger, Cleveland, O.

2,394,364. **Pressure Seal Including Packing Rings Having Rubber-Like Characteristics.** N. A. Christensen, South Euclid, O.

2,394,454. **Rubber Sole for Sport Shoes Having a Tread Surface with Zigzag Projections.** F. Kappeler, Bulach, assignor to A. G. R. & E.



The C. P. Hall Co.
CHEMICAL MANUFACTURERS

ACCELERATORS

PLASTICIZERS

ANTIOXIDANTS

A Complete Line of Approved Compounding Materials

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.

Huber, Schweizerische Kabel-, Draht-un Gummiwerke, Pfaffikon, both in Switzerland.

2,394,478. **In a Bonded Abrasive Article, a Tie Bond Layer Including as Essential Ingredient, a Substantial Proportion of Polychloroprene and a Phenolic Resin.** J. A. Prentice, assignor to Carborundum Co., both of Niagara Falls, N. Y.

2,394,522. **Foundry Core Binder of Chlorinated Rubber and Chlorinated Paraffin.** H. A. Pace, assignor to Wingfoot Corp., both of Akron, O.

Dominion of Canada

433,637. **Parachute Pack.** J. R. C. Quilter, Voking, Surrey, England.

433,640. **In a Watertight Door Lock Assembly Including a Lock Actuating Shaft to Which Are Attached Operating Handles, a Gasket of Resilient Watertight Material between the Base of One of the Handles and the Door.** J. R. Stachouse, St. John, N. B.

433,642. **In Apparatus Provided with a Gas Storage Space, Gastight, Flexible Diaphragms.** J. H. Wiggins, Chicago, Ill., U.S.A.

433,682. **Resilient Seat.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of M. C. Teague, Ridgewood, N. J., U.S.A.

433,683. **Watertight and Airtight Bag.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of V. H. Hurt, Cranston, R. I., U.S.A.

433,693. **V-Type Power Transmission Belt of Textile Material and Rubber-Like Material.** B. F. Goodrich Co., New York, N. Y., assignee of W. H. Van Buren, Akron, O., both in U.S.A.

433,694. **Reenforced Belt.** B. F. Goodrich Co., New York, N. Y., assignee of F. G. Skeyhan, Akron, O., both in the U.S.A.

United Kingdom

575,186. **Resilient Mountings.** Harris Products Co.

PROCESS

United States

2,392,173. **Bags of Rubber for Hydraulic Accumulators.** J. Mercier, New York, N. Y.

2,392,590. **Recapping Rubber Tires with a Vulcanizable Rubber-Like Copolymer of a Conjugated Diolefin and Isobutylene Tread Stock.** W. H. Hulswit, Jr., and H. C. Wiechmand, both of Detroit, Mich., assignors to United States Rubber Co., New York, N. Y.

2,392,929. **Making a Mold for an Artificial Tooth from Molten Vinyl Chloride.** P. W. Lee, York, Pa., assignor to Dentists' Supply Co. of New York, New York, N. Y.

2,392,967. **Latex-Coated Textile Hose.** M. Balkin, Bentham, assignor to Sillick Holding Co., Ltd., Newcastle-upon-Tyne, both in England.

2,392,992. **Rubber-Coated Accordion-Pleated Tube.** R. C. Martin, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,393,024. **Coating a Lead-Sheathed Cable with a Rubber Hydrohalide Solution.** T. K. Cox, Randallstown, A. N. Gray, Joppa, and V. A. Rayburn, Baltimore, all in Md., assignors to Western Electric Co., Inc., New York, N. Y.

2,393,035. **Mechanically Recovering Rubber from the Roots of Russian Dandelions.** R. K. Eskew, Glenside, and P. W. Edwards, Philadelphia, both in Pa., assignors to the United States of America, as represented by Claude R. Wickard, Secretary of Agriculture and his successors in office.

2,393,486. **Fabricating Articles of Decorative Plastic Elements.** M. H. Storch, Belle Harbor, L. I., N. Y.

2,394,122. **Cellular Expanded Rubber Product.** J. Urmston, Montclair, N. J., assignor to Callender's Cable & Construction Co., Ltd., a corporation of England.

2,394,327. **Mold-Vulcanized Article of Rubber Having an Impervious Protective Skin Coating of Rubbery Material.** P. F. Niessen, Canal Fulton, and A. R. Cox, Cuyahoga Falls, O., assignors to B. F. Goodrich Co., New York, N. Y.

2,394,419. **Wash Pad from Porous Sponge-Like Rubber.** C. E. Zimmerman, Chicago, Ill.

Dominion of Canada

433,727. **Rubber Films with Holes therein except in Selected Areas.** United States Rubber Co., New York, N. Y., assignee of H. C. Tingey, Nutley, N. J., U. S. A.

United Kingdom

575,200. **Synthetic Resins.** J. Prior and Lumb Hall Engineering Co., Ltd.

575,244. **Tubes.** United States Rubber Co.

575,264. **Treatment of Felt.** Dunlop Rubber Co., Ltd., J. Rogerson, and F. W. Warren.

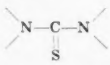
CHEMICAL

United States

2,391,867. **As Back Filling for a Pile Fabric, a Composition Including a Dispersion in an Aqueous Solution of a Fixed Caustic Alkali, an Alkali-Soluble, Water-Insoluble Cellulose Hydroxyalkyl Ether, and Rubber Latex.** J. A. Clark, Port Chester, N. Y., assignor to Sylvania Industrial Corp., Fredericksburg, Va.

2,391,920. **Polymerizing Ethylene by Heating in the Presence of a Catalyst Including a Dialkyl Dioxide of the Formula ROOR', in Which R and R' are Simple Unsubstituted Alkyl Groups, Containing not More Than Three Carbon Atoms.** M. D. Peterson, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,392,041. **Polyvinyl Partial Acetal Resin Stabilized with a Small Amount of a Thiourea Containing the Radical**



F. Groff, Lakewood, O., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,392,131-132. **Linear Polymers of High Molecular Weight.** H. Dreyfus, London, England; C. Bonard, administrator of H. Dreyfus, deceased.

2,392,135. **As Coating Composition, a Suspension of Copolymer of Vinyl Acetate and Vinyl Chloride in a Medium Including Water Containing in Solution a Water-Soluble Organic Plasticizer.** H. O. Farr, Jr., Pittsburgh, Pa., assignor to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,392,139. **Clear and Hard Plastic Composition Obtained by Polymerizing Maleic Anhydride and Styrene in Cyclohexanone Which Is Retained in the Composition as a Plasticizer.** H. L. Gerhart, Milwaukee, Wis., assignor to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,392,140. **Copolymer of Cyclopentadiene and an Unsaturated Gylceride Oil.** H. L. Gerhart, Milwaukee, Wis., assignor to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,392,289. **Styrene.** C. R. McCullough and W. H. Gehrke, Dayton, O., assignors to Monsanto Chemical Co., a corporation of Del.

2,392,303. **Producing Acrylic Nitrile by Dehydration of Ethylene Cyanhydrin.** F. R. Balcar, Stamford, Conn., assignor to Air Reduction Co., Inc., New York, N. Y.

2,392,346. **Wrinkle Composition Consisting of the Heat Reaction Product of Oil Soluble Resin, Unblown Drying Oil, and a Polycarboxylic Acid.** W. A. Waldie, assignor to New Wrinkle, Inc., both of Dayton, O.

2,392,366. **Reaction Product of an Aldehyde and a Triazine Derivative.** G. F. D'Alelio and J. W. Underwood, Pittsfield, Mass., assignors to General Electric Co., a corporation of N. Y.

2,392,378. **Polymers Obtained from a Mixture of Chlorotrifluoroethylene and an Olefin Hydrocarbon in Contact with a Peroxy Compound as a Catalyst.** W. E. Hanford, Easton, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,392,402. **Polymer Obtained by Reacting with a Mixture of an Alkaline Disulfide and an Alkaline Monosulfide, an Organic Compound Containing Adjacent Aliphatic Carbon Atoms to Each of Which Is Attached a Substituent Split off during the Reaction.** J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., a corporation of Del.

2,392,412. **Composition for Lining the Seams of Sheet Metal Containers for Anti-Freeze Liquids, etc., Including the Following Mixture: a Copolymer of Vinyl Acetate and Vinyl Chloride, a Mixture of Chlorinated Diphenyl and Butyl Phthalyl Butyl Glycolate as a Plasticizer, a Compatible Solvent, and a Filling and Coloring Material.** J. E. Robinson, Glen Ellyn, and P. W. Millelot, Jr., Maywood, both in Ill., assignors to American Can Co., New York, N. Y.

2,392,413. **Oxygenated Acyclic Terpene.** A. L. Rummelsburg, assignor to Hercules Powder Co., both of Wilmington, Del.

2,392,466. **Direct Production of Styrene from Benzene and Ethylene.** W. I. Denton, Woodbury, and C. H. Schlesman, Camden, both in N. J., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,392,497. **Producing a Film-Forming Material from a Mixture of Predominantly Non-Paraffinic Hydrocarbons Derived from the Solvent Processing, with Aqueous Phenol Solvent, of a Petroleum Oil to Increase the Concentration of Paraffinic Constituents therein.** J. J. O'Neill, Chester, Pa., assignor to Sinclair Refining Co., New York, N. Y.

2,392,554. **Improved Process for the Production of Stable Mercaptans of High Molecular Weight.** W. A. Schulze, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,392,555. **High-Boiling Mercaptans.** W. A. Schulze, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,392,574. **In a Composite Article Including a Layer of a Rubber-Like Material Derived from a Partially Hydrolyzed Polyvinyl Ester, and a Layer of Metal With a Phenolic Resin Base Coat, an Intermediate Adhesive Coating Consisting of a Partially Hydrolyzed Polyvinyl Acetate, Red Iron Oxide, Lead Chromate, Magnesium Oxide, and a Heat-Hardened-In-Situ Phenol Aldehyde Resin.** C. F. Brown, Grosse Pointe Park, Mich., assignor to United States Rubber Co., New York, N. Y.

2,392,578. **Rigid Sheets of Polymerized Unsaturated Compounds.** A. G. Chenicek, Barberton, O., assignor to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,392,585. **In the Process of Conducting Successive Batch Polymerization Operations in a Single Vessel When Polymerizing Butadiene-1,3 and Another Monomer Containing a**



Group in Aqueous Emulsion, the Improvement of Effecting Each Succeeding Batch Polymerization Operation in the Presence of an Aliquot Portion of the Dispersion Obtained in the Preceding Operation, to Prevent the Formation of a Rubbery Deposit on the Inside Surfaces of the Polymerization Vessel During Successive Operations. C. F. Fryling, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,392,589. **Composition of Matter Including a Normally Solid Polyvinyl Material and a Normally Liquid Organic Condensation Reaction Product of Formaldehyde and a Tertiary Alkyl Alcohol.** M. T. Harvey, South Orange, N. J., assignor to Harvel Research Corp., a corporation of N. J.

2,392,607. **Mono-Aryl Melamines.** D. E. Nagy, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,392,608. **Reacting a Secondary Amine and 1,3-Dicyanoguanidine to Produce N_1-Di-Substituted Melamines.** D. E. Nagy, Stamford, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,392,618. **For Adhesively Bonding a Rubber Composition to a Metal Surface, an Intermediate Bonding Layer Including Rubber Chloride Combined with a Rubber Derivative Obtained by the Depolymerizing Action of Heat and Oxygen on Dissolved Raw Rubber in the Presence of Free Sulfur and a Vulcanization Accelerator.** O. H. Smith, West Englewood, N. J., assignor to United States Rubber Co., New York, N. Y.

2,392,621. **Liquid Composition Polymerizable to Form a Synthetic Resin and Containing Chiefly a Monomeric Glycol Bis Ester of a Lower Alkyl Half Ester of an Alpha-Beta Unsaturated Alpha-Beta Dicarboxylic Acid, the Alkyl Groups of Which Contain 1 to 4 Carbon Atoms.** F. Strain, Barberton, O., assignor to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

2,392,686. **Resinous Casting Composition from Phenol Reacted with Formaldehyde in the Presence of Polyvinyl Alcohol.** F. M. Murdock, Chicopee Falls, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,392,691. **Rubber-Phenol Aldehyde Condensation Products.** F. J. W. Popham, New Barnet, assignor to British Rubber Producers' Research Association, London, both in England.

2,392,710. **Interpolymerization of Styrene, Partially Polymerized Dehydrated Castor Oil, and Partially Polymerized Linseed Oil.** L. E. Wakeford, and D. H. Hewitt, both of Homerton, London, England.

2,392,713. **Reclaiming a Dimethyl Silicone Elastomer by Treating it with a Small Amount of a Dimethyldihalogenosilane.** J. G. E. Wright, Alplaus, and C. S. Oliver, all of Schenectady, N. Y., assignors to General Electric Co., a corporation of N. Y.

2,392,732. **Coating Composition Including a Solution in an Organic Solvent of a Resin Obtained by Polymerizing Cyclopentadiene in a Glyceride of Fatty Acid.** H. L. Gerhart, Milwaukee, Wis., assignor to Pittsburgh Plate Glass Co., Pittsburgh, Pa.

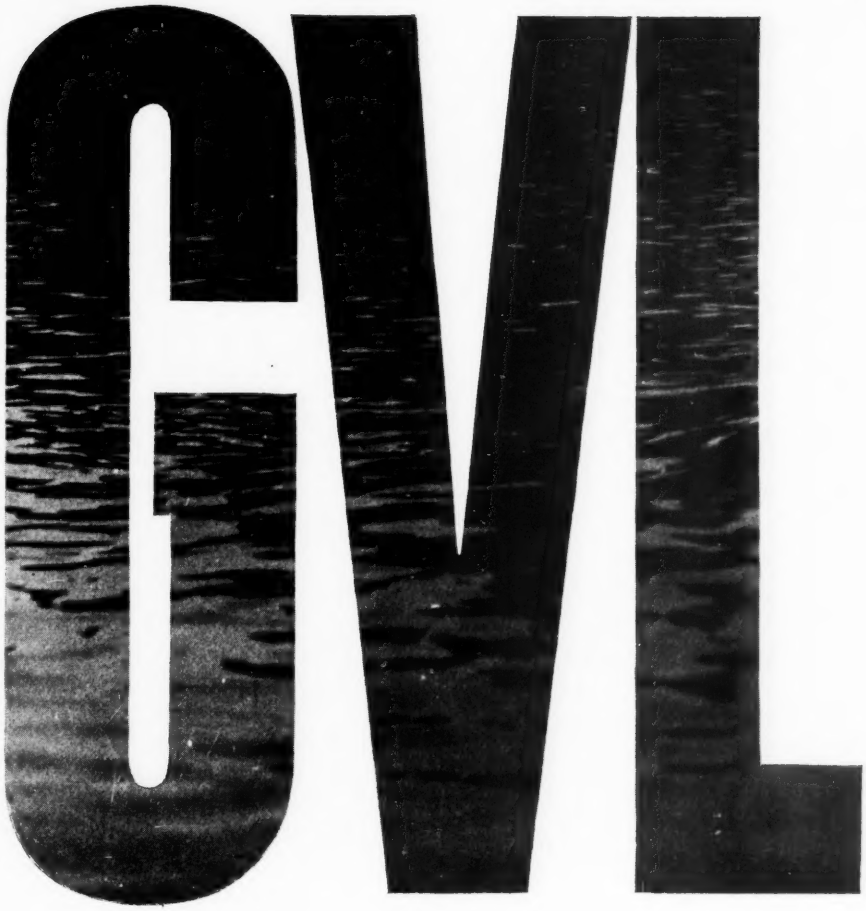
2,392,739-740. **Separation of Olefins.** J. T. Horeczy and E. F. Wadley, both of Baytown, Tex., assignors to Standard Oil Development Co., a corporation of Del.

2,392,756. **Material Obtained by Polymerizing a Halogen-Substituted 1,3-Butadiene Containing not More Than 3 Halogen Atoms in the Presence of a Di-Ester of an Aliphatic Alpha-Saturated Alpha,Beta-Dicarboxylic Acid and a Monohydric Unsaturated Alcohol Containing up to 10 Carbon Atoms.** C. J. Mighton, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,392,825. **Latex Substantially Free of Fixed Alkali Containing 0.1 to 10 of Di (p-hydroxyphenyl)-1,1Cyclohexane; the Latex is Thickened by the Zinc-Ammonia Complex in an Amount Less Than 1% on the Rubber.** D. W. MacLeod, Boston, assignor to General Latex & Chemical Corp., Cambridge, both in Mass.

2,392,837. **Reaction Product of an Aldehyde**

how can you use this UNUSUAL water-miscible SOLVENT?



(GAMMA VALEROLACTONE)

The wide-range adaptability of this unusual water-miscible solvent suggests that you may be interested in samples for your own experimentation and tests. They will be sent promptly on request, together with technical information.

Monsanto GVL is completely miscible with water and most organic liquids. It is non-irritating and safe for most normal uses — non-flammable at ordinary temperatures — colorless — possesses only a mild odor. Its solvent action does not disappear when mixed with water, but remains present in proportion to its concentration. It is a good solvent for most synthetic resins, films, and fibers.

Note the physical properties and suggested applications of Monsanto GVL — they may indicate new uses to you. Samples and technical bulletin No. OD-104 may be obtained by contacting the nearest Monsanto Office, or writing MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1702 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Cincinnati, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

MONSANTO CHEMICALS
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These Present Applications May Suggest New Uses to You

Special printing inks	Window-cleaning fluid
Hormone, drugs, essential oil extraction	Manicure-lacquer remover
Adhesives	Anti-blush for lacquers and lacquer thinners
Lithography	
Resin manufacture	Brake fluid
Solvent carrier for special insecticides	Dye baths

Chemical and Physical Properties

Pounds per Gallon	8.75
Boiling Point (760 mm.)	Approximately 206°C. (403°F.)
Flash Point (Cleve. Open Cup)	96°C. (205°F.)
Fire Point (Cleve. Open Cup)	104°C. (220°F.)
Crystallizing Point	Approximately −37°C. (−35°F.)
Viscosity at 25°C.	2.18 Centipoises
pH Anhydrous	7.0
pH 10% solution in distilled water	4.2

and a Diazine Derivative. G. F. D'Alelio and J. W. Underwood, both of Pittsfield, Mass., assignors to General Electric Co., a corporation of N. Y.

2,392,847. **Rubber-Like Composition of Matter Including in Combination an Interpolymer of Isobutylene with a Diolefin, together with Polyisobutylene.** P. K. Frolich, Westfield, N. J., assignor by mesne assignments to Jasco, Inc., a corporation of La.

2,392,855. **Composition Including an Iso-Olefin-Diolefin Interpolymer of High Molecular Weight, Sulfur, and a Hydrocarbon Oil.** I. E. Lightbown, Roselle, N. J., and N. S. Beekley, Baton Rouge, La., assignors by mesne assignments, to Jasco, Inc., a corporation of La.

2,392,857. **Gelatinized Composition Including Polyvinyl Chloride, Polymerized Methyl Methacrylate, and a Non-Polymerizable Liquid Plasticizer.** J. H. McGill, Manchester, England, assignor to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,392,881. **Preventing the Crazing of Synthetic Rubber by Means of Liquid Aromatic Hydrocarbons Containing an Aliphatic Polyamine Having at Least 4 Amine Groups, of Which 2 Are Primary Amino Groups.** W. L. Rittschof and W. A. Proell, assignors to Standard Oil Co., all of Chicago, Ill.

2,392,910. **Refining Styrene Admixed with Impurities Including Phenyl Acetylene and Organic Color Imparting Material.** R. A. Franz, Wallingford, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,392,935. **Purification of Mercaptothiazoles.** R. A. Mathes, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,392,960. **Cyclic Process for the Production of Styrene from a Butane-Butene-Butadiene Fraction Obtained by Cracking Petroleum Hydrocarbons.** C. W. Watson, Tuckahoe, assignor to Texas Co., New York, both in N. Y.

2,392,972. **Preparing a Water-Vapor-Resistant Surface on a Porous Paper by Coating It with a Polymer Containing at Least 75% of Vinyl Chloride, Treating the Coated Paper with a Solution of a Copolymer of Vinylidene Chloride and Vinyl Chloride Dissolved in an Aromatic Hydrocarbon, and Evaporating the Latter.** La V. E. Cheyney, assignor to Wingfoot Corp., both of Akron, O.

2,392,974. **Amyl-Beta-Benzyloxypropionate, the Phenyl Group of Which Is Linked to the Oxy Group through the Methylene Group of the Benzyl Radical.** A. M. Clifford and J. G. Lichty, Stow, assignors to Wingfoot Corp., Akron, both in O.

2,392,982. **For a Windshield Wiper, Vulcanized Rubber Composition Containing a Small Proportion of a Sulfonated Organic Di-Basic Acid Ester.** M. T. Flaxman, Ponca City, Okla., assignor to Union Oil Co. of California, Los Angeles, Calif.

2,393,000. **Beta Alkoxy Propionyl Compound.** N. V. Seeger, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,393,006. **Coated Film Including a Rubber Hydrochloride Film Coated with a Solution in a Rubber Hydrochloride Solvent of a Benzene-Soluble Copolymer of Vinyl Chloride and Vinylidene Chloride.** J. F. Vincent, assignor to Wingfoot Corp., both of Akron, O.

2,393,007. **In the Process of Polymerizing Butadiene-1,3 and an Aliphatic Acrylonitrile in a Medium Containing an Emulsifying Agent and a Peroxide Oxidant, the Step Which Includes Agitating and Heating the Reaction Mixture in a Closed Atmosphere Containing Oxygen.** W. D. Wolfe, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,393,132. **Continuous Process for the Production of 2-Vinylpyrrole.** C. R. Wagner, Utica, O., assignor to Phillips Petroleum Co., a corporation of Del.

2,393,133. **Polymerization of an Aqueous Emulsion of a Mixture of Butadiene-1,3 and Styrene in the Presence of a Soap of a Monocarboxylic Acid and a Volatile Alkyl Monoamine.** L. M. White, Nutley, N. J., assignor to United States Rubber Co., New York, N. Y.

2,393,156. **3-Beta-Methallyl-4-Methallyloxy-diphenylamine.** C. F. Gibbs, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,393,157. **Promoting the Emulsion Polymerization of Conjugated Diolefins by Adding a Member of the Group of Carbon Disulfide, Mixtures of Carbon Disulfide with Benzyl Mercaptan and Mixtures of Carbon Disulfide with Octyl Mercaptan.** A. H. Gleason, Westfield, and W. J. Sparks, Elizabeth, both in N. J., assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,393,206. **Improved Method of Preparing Interpolymers of a Conjugated Diolefin and a Nitrile in Aqueous Emulsion.** B. M. Vanderbilt, Westfield, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,393,208. **Coagulating a Synthetic Latex by Introducing It into an Agitated Coagulant Solution at a Temperature between 85 and 130° F.** W. W. Waterman, Cranford, N. J., and P. T. Parker, Baton Rouge, La., assignors to Standard Oil Development Co., a corporation of Del.

2,393,222. **Rubber-Like Article Including a Base of Factice and a Flexible Water-Soluble Binder therefor of Cellulose Derivative.** A. Pischel, New York, N. Y., and H. F. Stowe, Rutherford, N. J., assignors to Eagle Pencil Co., New York, N. Y.

2,393,261. **Creaming a Synthetic Rubber Latex in the Presence of a Hydrophilic Collodial Creaming Agent and an Alkali Silicate.** C. R. Peaker, Union City, Conn., assignor to United States Rubber Co., New York, N. Y.

2,393,321. **Composition Including a Linear Chain Olefinic Polymer With Molecular Weight between 15,000 and 500,000, and Iodine Number between 0.001 and 50, and a Curing Agent Including a Substance Containing a Quinonoid Nucleus.** J. P. Haworth, Westfield, N. J., assignor, by mesne assignments, to Jasco, Inc., a corporation of La.

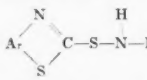
2,393,348. **In the Process of Polymerizing a Butadiene Mixture in Aqueous Emulsion, the Steps of Maintaining 1% to 6% of Butadiene on the Amount of Aqueous Emulsion and Coagulating the Emulsion in the Presence of the Butadiene by Adding a Brine Solution.** W. W. Waterman and B. M. Vanderbilt, both of Cranford, N. J., assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,393,381. **Cyclic Process for Making Butadiene.** H. D. Kinsey, Whiting, Ind., and T. H. Kelly and P. J. Ferrara, Charleston, W. Va., assignors to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,393,438. **Copolymerizing an Alkyl Ester of Acrylic Acid and Isoprene in an Aqueous Emulsion Containing a Caseinate and a Peroxide Catalyst.** S. M. Weisberg, E. G. Stimpson, and J. Greenspan, assignors to Scaltest, Inc., all of Baltimore, Md.

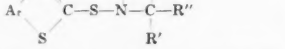
2,393,495. **Coating Composition Strongly Adherent to Vulcanized and Unvulcanized Natural Rubber Including a 36% Butyl Formate Dispersion of Polychloroprene Diluted with Gasoline.** W. E. Tann, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,500. **Composition of the Formula**



Where Ar Is an Orthoarylene Radical, and R Is an Alkyl Radical. E. L. Carr, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,507. **Compound of the Formula**



Where Ar Is an Orthoarylene Radical, R and R' Are from the Group of Hydrogen, Alkyl Radicals, and Hydroxyalkyl Radicals, and R'' Is an Hydroxyalkyl Radical. E. L. Carr, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,510. **Unsaturated Ketones.** W. A. Bailey, Jr., Oakland, and W. H. Peterson, Berkeley, assignors to Shell Delevopment Co., San Francisco, and W. H. Peterson, Berkeley, assignors to Shell Development Co., San Francisco, all in Calif.

2,393,512. **Homogeneous Composition Including Polyvinyl Chloride and Glycerol Di(Cresylic Acid) Ether.** F. A. Bent, Berkeley, and K. E. Marple, Oakland, assignors to Shell Development Co., San Francisco, all in Calif.

2,393,513. **Composition Including a Polyvinyl Acetal Resin and a Diglycerol Trialkyl Ether.** F. A. Bent, Berkeley, and K. E. Marple, Oakland, assignors to Shell Development Co., San Francisco, all in Calif.

2,393,537. **Treating Hydrocarbon Mixture Containing Monoolefins of the Class of Normal Butylenes and Amylenes.** H. C. Huffman, Long Beach, assignor to Union Oil Co. of California, Los Angeles, both in Calif.

2,393,737. **Preparation of Esters of Acrylic and Alpha-Alkacrylic Acids.** N. M. Bortnick, assignor to Rohm & Haas Co., both of Philadelphia, Pa.

2,393,740. **The Alpha-Alkylacrolein Diacylates Selected from the Group of Alpha-Ethocrolein Diacretate, Alpha-Ethacrolein Dipropionate and the Alpha-Ethacrolein Dibutyrates.** J. H. Brant and F. R. Conklin, both of Kingsport, Tenn., assignors to Eastman Kodak Co., Rochester, N. Y.

2,393,752. **Reaction Product of Preformed Dimethylol Urea and a Halogenated Acetamide.** G. F. D'Alelio, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,393,753. **For an Acid-Curing Thermosetting Resin, an Accelerating Curing Agent Consisting of the Reaction Product of Ingredients Including an Aldehyde and a Diazinyl Carboxy-Alkyl Sulfide.** G. F. D'Alelio and J. W. Underwood, both of Pittsfield, Mass., assignors to General Electric Co., a corporation of N. Y.

2,393,754. **Reaction Product of an Aldehyde and a Triazine Derivative.** G. F. D'Alelio and J. W. Underwood, both of Pittsfield, Mass., assignors to General Electric Co., a corporation of N. Y.

2,393,755. **Preparing Hydroxyarylamino Triazines.** G. F. D'Alelio, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,393,801. **Cellulose Organic Acid Ester Plastic Containing a Plasticizer and, as Agent for Inhibiting Deterioration of the Plastic by Ultra-Violet Light, a 3-Alkyl-2-Phenylamino Benzothiazoline.** D. R. Morey, Rochester, N. Y., and R. L. Tichenor, Oak Ridge, Tenn., assignors to Eastman Kodak Co., Rochester, N. Y.

2,393,802. **Cellulose Organic Acid Ester Plastic Including a Plasticizer, and as Agent for Inhibiting Deterioration of the Plastic by Ultra-Violet Light, NN'-Diphenyl Acetamidine.** D. R. Morey, Rochester, N. Y., and R. E. Tichenor, Oak Ridge, Tenn., assignors to Eastman Kodak Co., Rochester, N. Y.

2,393,825. **Polyamines.** M. Senkus, assignor to Commercial Solvents Corp., both of Terre Haute, Ind.

2,393,870. **Converting Rubber to Rubber Hydrochloride by Contacting Rubber with Gaseous Hydrogen Chloride in the Presence of a Penetrant in Vapor Phase; the Penetrant Is a Solvent for Rubber and Hydrogen Chloride.** H. F. Reeves, Jr., and T. M. Andrews, both of Weeks, assignors to Bay Chemical Co., Inc., New Orleans, both in La.

2,393,871. **Reacting Vulcanized Rubber with Gaseous Material from the Group of Hydrogen Chloride, Hydrogen Bromide, and Hydrogen Iodide in the Presence of Penetrant in Gaseous Form Capable of Swelling the Rubber.** H. F. Reeves, Jr., and T. M. Andrews, both of Weeks, assignors to Bay Chemical Co., Inc., New Orleans, both in La.

2,393,889. **N,N'-Di-Cyclohexyl-p-Phenylene Diamine.** E. W. Cook, New York, N. Y., and W. D. Thomas, Jr., Stamford, Conn., assignors to American Cyanamid Co., New York, N. Y.

2,393,894. **Separating Camphene from a Terpene Mixture Including Camphene and Pinene.** N. T. Farinacci, Wilmington, and W. J. Kirkpatrick, Marshallton, assignors to Hercules Powder Co., Wilmington, both in Del.

2,393,913. **Production of Resin by a Process Which Includes Treating a Crude Aromatic Hydrocarbon Oil Containing Gum-Forming Constituents with Sulfuric Acid, Neutralizing Remaining Acidic Bodies, Distilling to Produce a Refined Solvent and a Resinous Residue, and Extracting the Residue with a Solvent from the Group of Water or Dilute Sulfuric Acid.** W. A. King, North Haven, J. Kleiner, Wallingford, both in Conn., and J. R. Clark, Nutley, N. J., assignors to Allied Chemical & Dye Corp., New York, N. Y.

2,393,917. **Making Thiourea from Hydrogen Sulfide.** W. F. Lewis, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,393,967. **Polymerizing Tetrafluoroethylene.** M. M. Brubaker, Boothwyn, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,393,972. **Preparing from Polyamides an Insolubilized Infusible Shaped Article.** T. Le S. Cairns, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,394,000. **In Producing Resins Similar to Phenol-Aldehyde Resins, the Step of Liberating Aldehydes and Ketones from Lignо-Cellulosic Material by Acid Hydrolysis in the Presence of Live Steam under Pressure and Simultaneously Reacting with Phenol.** T. R. McElhinney, New Orleans, La., assignor to W. J. Gibbons, Jr.

2,394,025. **Producing a Shaped Article from a Polymerizable Material Including Butadiene and Isobutylene, together with Carbon Black.** T. A. TeGrotenhuis, Olmsted Falls, O.

2,394,101. **Protective Coating for Metal Articles during Shipment, Handling, Storage, etc., Composed of Ethyl Cellulose, Plasticizers, and Compatible Thermoplastic Resin.** H. C. Phillips, Wilmington, Del., and P. F. Robb, Birmingham, Mich., assignors to Hercules Powder Co., Wilmington, Del.

2,394,243. **Polymerizing Tetrafluoroethylene.** R. M. Joyce, Jr., Marshallton, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,394,266. **Production of a Resin Solid at Room Temperature by Polymerizing an Amylene-Containing Light Oil Isoprene Fraction Obtained from Light Oil Produced in the Vapor Phase Pyrolysis of Petroleum Oil.** F. J. Soday, Swarthmore, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,394,291. **Continuous Process for Preparing Dispersions of Polymerized Chloro-2-Butadiene-1,3.** W. S. Calcott, Woodstown, N. J., and H. W. Starkweather, assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,394,347. **In Polymerizing 2-Chloro-1,3-Butadiene in Aqueous Emulsion in the Presence of Sulphur, under Agitation, the Steps of Starting the Polymerization in Contact with Atmospheric Oxygen, and thereafter Increasing the Rate of Polymerization by Decreasing the Amount of Molecular Oxygen in Contact with the Polymerization Mass.** F. N. Wilder, Louisville, Ky., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

VALVAIR

TRADE MARK

AIR CONTROL VALVES

The need for a more efficient and durable air control valve prompted Valvair Corporation to develop a basic valve that has proven to be highly successful in continuous hard service.

The valve illustrated below is one of the many types available.



LEVER OPERATED FOUR-WAY VALVE

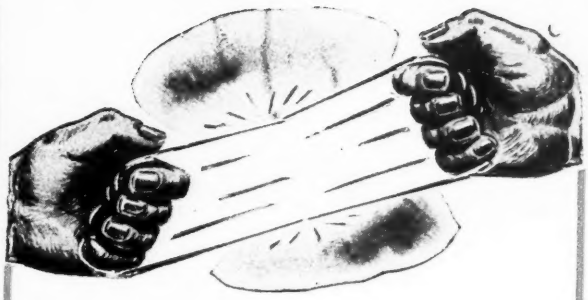
Valvair valves are new in design and principle, standard valves have been operated more than two million times without leak with air pressure exceeding 100 lbs. They are designed for indefinite life and exceptionally hard service.

They are compact—they do not have metal seals—the body is made of cast bronze and steel parts are made of stainless steel—they will not corrode.

They are made in five sizes—¼, ⅜, ½, ¾ and 1 inch—and in two-way, three-way, and four-way types. They can be furnished in eight or more different designs—knob, lever, foot, cam, clevis, single diaphragm, double diaphragm or solenoid operated.

They will control air efficiently up to 200 lbs. pressure with a very light movement. The area through the valves is equivalent to pipe size with minimum pressure drop. Write for literature.

VALVAIR CORPORATION
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INSURES THE FOOLPROOF FORMULATION OF GOOD-AGING, ALL-SYNTHETIC, LIGHT-COLORED —

- **Pressure Sensitive Adhesives**
- **Surgical Tape Masses**
- **Industrial Tape Masses**
- **Colorless Label Adhesives**
- **Stationers' Cements**
- **Paper Laminating Cements**
- **Hot Melt Adhesives**
- **Self-Supporting Window Stripping**
- **Damp-proof Cork Insulations**
- **Caulking Compounds**
- **Low-Modulus Sealing Compounds**

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ADVANCE SOLVENTS & CHEMICAL CORPORATION
245 Fifth Avenue
New York 16, N. Y.

2,394,367. **Dielectric Composition Consisting of Halogenated Diphenyl and a Nitrated Polynuclear Aryl Hydrocarbon.** F. M. Clark, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,394,375. **Producing an Adhesive Composition by Treating Phenol and Furfural to Obtain a Resin Solution and Adding thereto a Solution of Natural or Synthetic Rubber.** M. E. Gross, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,394,406. **Polymerizing a Mixture of a Butadiene-1,3 Hydrocarbon, Vinylidene Chloride, and an Acrylic Compound.** F. K. Schoenfeld, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,394,417. **Odor Stabilized Vinyl Resin.** V. Yngve, deceased, late of Highland Park, N. J., by L. Currie, executor, Rocky River, O., assignor, by mesne assignments, to Bakelite Corp., a corporation of N. J.

2,394,418. **Method of Inhibiting Color Caused by the Partial Decomposition by Heat of Vinyl Resins Containing Combined Vinyl Halide.** W. M. Quattelbaum, Jr., and C. A. Noffsinger, both of Charleston, W. Va., assignors to Carbide & Carbon Chemicals Corp., New York, N. Y.

2,394,498-500. **Wrinkle Finish Compositions.** W. A. Waldie, assignor to New Wrinkle, Inc., both of Dayton, O.

2,394,520. **Nitriles.** J. G. Lichty, Stow, O., assignor to Wingfoot Corp., Akron, both in O.

2,394,526. **Aliphatic Substituted Guanamines.** J. T. Thurston, Cos Cob, Conn., assignor to American Cyanamid Co., New York, N. Y.

Dominion of Canada

433,652. **Solid, Highly Adhesive Compositions Made from Decachlor Diphenyl Benzene and Chlorinated Diphenyl.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of F. M. Clark, Pittsfield, Mass., U.S.A.

433,661. **Resinous Emulsion Including an Organic Solvent, a Partially Reacted Thermosetting Phenol-Aldehyde Resin in the Alcohol Soluble Stage, and an Emulsifying Agent and Protective Colloid, Including a Glycinin Protein Peptized with Ammonium Hydroxide.** Canadian Westinghouse Co., Ltd., Hamilton, Ont., assignee of P. K. Porter, Pittsburgh, Pa., U.S.A.

433,684. **Polymerizable Vinyl Aromatic Compound Stabilized by a Halo-Ortho-Nitrophenol.** Dow Chemical Co., assignee of R. F. Boyer and C. L. Rubens, all of Midland, Mich., U.S.A.

United Kingdom

575,124. **Thermoplastic Materials in Fibrous or Cellular Form.** W. I. Taylor and British Celanese, Ltd.

575,125. **Cellular Material.** W. I. Taylor and British Celanese, Ltd.

575,126. **Plastic Compositions Suitable for Filling Surfaces of Cellular Material.** W. I. Taylor.

575,134. **Vulcanizable Polymerization Products.** Monsanto Chemical Co.

575,137. **Plasticized Natural or Synthetic Rubber-Like Compositions.** American Cyanamid Co.

MACHINERY

United States

2,392,049. **Apparatus for Making a Latex Protective Tube.** W. F. Kinnucan, Chicago, Ill.

2,392,190. **Core Support for an Extruder.** G. Ritter, Millington, N. J., assignor to Ruberoid Co., New York, N. Y.

2,392,315. **Footwear Pressing Apparatus.** H. L. Davis, Walpole, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,392,459. **Apparatus to Cut Plastic Objects from a Plastic Element Having a Plurality of Plastic Objects Attached thereto by Gates.** J. Casalino, Elmhurst, L. I., N. Y., assignor to J. H. Meyer Bros., Brooklyn, N. Y.

2,392,619. **Control Apparatus for Vulcanizing Presses.** L. E. Soderquist, assignor to McNeil Machine & Engineering Co., both of Akron, O.

2,392,667. **Tire Buffer.** P. E. Hawkinson, assignor to P. E. Hawkinson Co., both of Minneapolis, Minn.

2,393,023-024. **Apparatus for Coating a Hot, Lead-Sheathed Cable with a Rubber Adherent Compound.** T. K. Cox, Randallstown, A. N. Gray, Joppa, and V. A. Rayburn, Baltimore, all in Md., assignors to Western Electric Co., Inc., New York, N. Y.

2,393,452. **Apparatus for Shaping Plastics by Extrusion.** J. Bailey, West Hartford, and R. S. Jesionowski, Hartford, Conn., assignors to Plax Corp., Hartford, Conn.

2,393,498. **Separator for Fine Rubber Particles Carried in a Liquid.** D. A. Miller, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,502. **Spreading Apparatus.** C. W. Groncy, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,503. **Multiple-Pressure Responsive Locking Device for a Vulcanizer.** G. P. Boaomworth, Akron, and D. C. Milner, Barberton, assignors to Firestone Tire & Rubber Co., Akron, both in O.

2,393,504. **Bead Setting Device.** H. D. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,506. **Device to Mount Endless Fabric Bands on the Rotatable Drums of Tire Building Machines.** N. T. Briber, Los Angeles, Calif., assignor to Firestone Tire & Rubber Co., Akron, O.

2,394,318. **Device for Turning Plies of Tire Fabric about a Bead on the End Face of a Forming Drum.** C. S. McChesney, Kenmore, assignor to Dunlop Tire & Rubber Corp., Buffalo, both in N. Y.

2,394,392. **Tire Cutter.** E. G. Mascarenhas, Juiz de Fora, Brazil.

2,394,423. **Readily Destructible Building Form for the Production of Hollow Articles from Sheets of Rubber-Like Material.** M. R. Bell, Los Angeles, Calif., assignor to B. F. Goodrich Co., New York, N. Y.

2,394,465. **Apparatus for Applying a Bead to a Tire Fabric.** C. S. McChesney, Kenmore, assignor to Dunlop Tire & Rubber Corp., Buffalo, both in N. Y.

2,394,492. **Readily Destructible Building Form for the Production of Hollow Articles from Sheets of Rubber-Like Material.** E. M. Scharenberg, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

UNCLASSIFIED

United States

2,392,493. **Rim and Wheel Mounting for Pneumatic Tires.** H. A. Mullin, Redding, Calif.

2,392,577. **Textile Cover for Protecting Tire Treads from Wear.** M. Castricum, Grosse Pointe, Mich., assignor to United States Rubber Co., New York, N. Y.

2,392,748. **Joint for Electric Power Cables Maintained under Gas Pressure.** E. C. Lee, London, England, assignor to International Standard Electric Corp., New York, N. Y.

2,393,472. **Airplane Propeller and Anti-Icer therefor.** R. S. Johnson, West Los Angeles, Calif., assignor to Firestone Tire & Rubber Co., Akron, O.

2,393,494. **Bead Lock for Pneumatic Tires.** J. E. Hale, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,497. **Spark Plug.** D. W. Gregory, Jackson Heights, N. Y., assignor to Firestone Tire & Rubber Co., Akron, O.

2,393,501. **Pivotal Joint.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,393,679. **Hose Coupling.** R. R. Gunderson, Chicago, Ill.

2,394,078. **Joint Structure for an Inflatable Suit.** C. P. Krupp, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,394,311. **Brake Structure.** R. J. Keller, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,394,341. **Apparatus for Expanding a Ring within a Hose to Clamp It to a Coupling.** W. J. Strong, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,394,518. **Universal Multiple Cable Clamp.** H. L. Kindorf, San Francisco, Calif.

TRADE MARKS

United States

418,509. **Torsilastic.** Springs of rubber and metal. B. F. Goodrich Co., New York, N. Y.

418,511. **Goodyear-Guardian.** Crib sheets. Goodyear Rubber Sundries, Inc., New Haven, Conn.

418,512. A fanciful drawing with the word: **"Pyrotex"** above a heavy rule. Felted asbestos web material. Raybestos-Manhattan, Inc., Passaic, N. J.

418,517. **Ventiflex.** Insulated electric flexible conductors and electric insulating material. Morgan Crucible Co., Ltd., London, England.

418,544. **Paxcote.** Pressure-sensitive sealing tape. Cofax Corp., New York, N. Y.

418,567. Representation of a rising sun with the word: **"Lustray."** Raincoats. Lustberg, Nast & Co., Inc., New York, N. Y.

418,571. **Citation.** Fountain pens and parts thereof. L. E. Waterman Co., New York, N. Y.

418,586. **Fiberglas.** Resin and rubber coated cloths containing glass fibers. Owens-Corning Fiberglas Corp., Toledo, O.

418,606. **"Meth-Bond."** Thermo-setting synthetic resin adhesives. Consolidated Vultee Aircraft Corp., San Diego, Calif.

418,607. **Sealtite.** Raincoats. Polan, Katz & Co., Baltimore, Md.

418,638. **Stopperless.** Water bottles. Seamless Rubber Co., New Haven, Conn.

418,673. Representation of a pine tree above the word: **"Domit."** Footwear. Calzado Domit, S. A., Mexico City, Mexico.

418,689. Representation of two arrows forming the top and the bottom of a frame for the word: **"Flanelan."** Waterproofed and water-repellent textile fabrics of cotton. Landers Corp., Toledo, O.

418,690. Representation of two arrow heads pointed toward the word: **"Sani-Sole"** to form the sides of a frame. Coated or impregnated cloth for shoe insoles. Landers Corp., Toledo, O.

418,691. Representation of two arrow heads pointed away from the word: **"Stedi-Tred"** forming the sides of the frame. Coated or impregnated cloth for shoe insoles. Landers Corp., Toledo, O.

418,692. Representation of a wing with the word: **"Versilan"** written across it. Plastic coated cotton fabrics. Landers Corp., Toledo, O.

418,703. **Zephyr.** Arch supports. C. C. Edinger, doing business as Charles C. Edinger Co., Brooklyn, N. Y.

418,704. **Arch-Craft.** Footwear. B. Cook, New York, N. Y.

418,707. **Holidebs.** Slippers. Holiday Casuals, New York, N. Y.

418,710. **Jantzen.** Swimming suits and caps. Jantzen Knitting Mills, Portland, Oreg.

418,714. **Avonite.** Soles. Avon Sole Co., Avon, Mass.

418,722. **Captivators.** Footwear. Edison Bros. Stores, Inc., St. Louis, Mo.

418,733. The word: **"Resistoflex"** superimposed upon the letter **"R".** Gloves, aprons, caps, kerchiefs, smocks, and sleeve guards to afford protection against oils, hydrocarbon fuels, and organic solvents. Resistoflex Corp., Belleville, N. J.

418,734. The word: **"Resistoflex"** superimposed upon the letter **"R".** Plasticizing solutions for restoring and preserving the flexibility of articles made of compar (compounded polyvinyl alcohol), etc. Resistoflex Corp., Belleville, N. J.

418,742. **Girlette.** Corsets, brassieres, and garter brassieres and girdles. Lily of France Corset Co., Inc., New York, N. Y.

418,756. **World O' Youth.** Waterproof sheets, crib sheets and pads, etc. Plymouth Wholesale Dry Goods Corp., New York, N. Y.

418,757. Fanciful pictures of children with the words: **"World O' Youth."** Waterproof sheets, etc. Plymouth Wholesale Dry Goods Corp., New York, N. Y.

418,786. **Emblem.** Fountain pens and parts thereof. L. E. Waterman Co., New York, N. Y.

418,818. **Corsetcraft.** Girdles and corsets. Capitol Garter Co., New York, N. Y.

418,821. Representation of a crest below the word: **"Packard."** Plumbing fixtures. Sid Mack Co., Jacksonville, Fla.

418,824. **Beaufort Supersole.** Composition sheet material for footwear. Homasote Co., Inc., Fernwood, N. J.

418,831. **Lady Austin Foundations.** Corsets, girdles, and brassieres. Austin Corset Co., Inc., New York, N. Y.

418,878. **Maxiflux.** Electrical apparatus for attachment to the firing mechanism of guns to control the firing thereof. Dunlop Rubber Co., Ltd., Erdington, Birmingham, England.

418,879. **Maxifort.** Electrical apparatus for attachment to the firing mechanism of guns to control the firing thereof. Dunlop Rubber Co.,

418,894. **Dresinol.** Resin emulsions. Hercules Powder Co., Wilmington, Del.

418,895. **Chlor-Isopol.** Synthetic rubber cement. Union-Baystate Co., Inc., Cambridge, Mass.

418,917. The word: **"Resistoflex"** superimposed on the letter **"R".** Molded plastic articles made in whole or part of compar (compounded polyvinyl alcohol). Resistoflex Corp., Belleville, N. J.

418,926. **Negatabs.** Adhesive tabs. Steck Co., Austin, Tex.

418,928. **Insert-O-Flex.** Footwear. Scholl Mfg. Co., Inc., Chicago, Ill.

418,954. Representation of a cowboy and the words: **"Buck Skein Joe."** Rainwear. Lustberg, Nast & Co., Inc., New York, N. Y.

419,021. Representation of a label with the words: **"Bobson."** Footwear. B. Friedman Shoe Co., Inc., New York, N. Y.

419,044. The word: **"Dugud"** written twice to form a cross, below which are the words: **"Do Good."** Surgical tape. J. D. Harris, Larchmont, N. Y.

New "PRECISION" Equipment for RUBBER RESEARCH AND CONTROL

"PRECISION" TORSIONAL HYSTEROMETER

Developed by United States Rubber Co. General Laboratories

Developed for simple, precise and rapid measuring of the mechanical hysteresis of elastomers with relation to their service behavior. The "Precision" Torsional Hysterometer also can be used to study the permanent hysteresis effect produced by prolonged heating at high temperatures, using laboratory samples or sections cut from finished elastomeric products. The instrument may be used to measure the modulus of elastomeric compounds or sections of composite structures consisting of elastomers combined with other materials, such as fabric.

The dumbell shaped test specimen used with the "PRECISION" Torsional Hysterometer is 2" long with a constricted portion 1½" long and a cross section of .100" x .100", being very similar to the T-50 test specimen.

The "PRECISION" Hysterometer consists primarily of a torsional pendulum, oscillating in a horizontal plane enclosed in a constant temperature cabinet. The pendulum is supported entirely by the rubber test specimen which furnishes the restorational torque.

The constant temperature cabinet is used when elevated temperatures are required for testing. The door is provided with a double Pyrex glass window for full visibility of specimen and the observation of torsional readings. A non-glaring light is provided to supply internal illumination. A holder is fastened to the top of the cabinet which holds the torsional unit on the outside while changing samples. **Send for Descriptive Bulletin No. T-10154-5-B.**

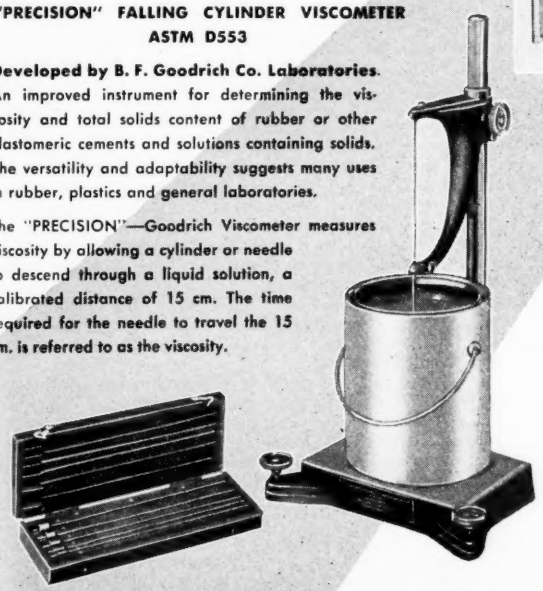


REFERENCES: *A Torsional Hysteresis Test for Rubber" by M. Mooney and R. A. Gerke—India Rubber World, January, 1941. "Application of the Torsional Hysteresis Test to Tires" by H. Wakeham and E. Honold —India Rubber World, December, 1945.*

"PRECISION" FALLING CYLINDER VISCOMETER ASTM D553

Developed by B. F. Goodrich Co. Laboratories. An improved instrument for determining the viscosity and total solids content of rubber or other elastomeric cements and solutions containing solids. The versatility and adaptability suggests many uses in rubber, plastics and general laboratories.

The "PRECISION"—Goodrich Viscometer measures viscosity by allowing a cylinder or needle to descend through a liquid solution, a calibrated distance of 15 cm. The time required for the needle to travel the 15 cm. is referred to as the viscosity.



THE "PRECISION" FALLING CYLINDER OFFERS FIVE MAJOR IMPROVEMENTS

1. Hair trigger release.
2. Cylinder guide — eliminates the necessity of maneuvering specimen can to maintain vertical descent of cylinder during test.
3. Leveling screws and spirit level permitting adjustment for lining the cylinder up vertically before it is released.
4. Elevating device insuring precise adjustment of bottom of needle to surface of test specimen at beginning of test.
5. Incorporation of calibrated distance of cylinder travel. Increases accuracy by eliminating any markings on cylinder.

Write for Bulletin No. T-10041-B.

A few of the many "PRECISION" Products for the rubber laboratory:

- DuPont Brittleness Tester
- Firestone Groove Cracker
- Goodyear Flexometer
- Goodyear Pendulum Rebound Machine
- Goodrich Viscometer
- U.S. Rubber Torsional Hysterometer

PRECISION SCIENTIFIC COMPANY

1736-54 N. Springfield Ave., Chicago 47, U.S.A.

Engineers and Builders of Scientific Research and Production Control Equipment

419,048 **Protelon.** Bowl and plate covers, etc. Protex Products Co., Jersey City, N. J.
419,101. **Witcogum.** Polymerized vegetable oil used as a rubber substitute. Witco Chemical Co., Chicago, Ill.
419,116. **Tantaline.** Foundation garments. Willoform Mfg. Co., New York, N. Y.
419,151. **Athco.** Footwear. Athletic Shoe Co., Chicago, Ill.
419,164. **Skylac.** Synthetic resin coating compositions. Monsanto Chemical Co., St. Louis, Mo.
419,195. **Sanyon.** Gum composition used as a binder for pigment printing and dyeing. Stein, Hall & Co., Inc., New York, N. Y.
419,207. **Clad.** Protective skin creams. B. F. Goodrich Co., New York, N. Y.
419,218. **"Steinweld."** Inflatable or pneumatic pillows and mattresses. M. R. Stein, New York, N. Y.
419,224. **Flexiband.** Adhesive bandages. Scholl Mfg., Inc., Chicago, Ill.
419,230. **Iroquois.** Tires and inner tubes. Pharis Tire & Rubber Co., Newark, O.
419,242. **Uni-Vac.** Merchandise envelopes. Ivers-Lee Co., Newark, N. J.
419,244. **Cub.** Hose. Thermoid Co., Trenton, N. J.
419,257. Representation of three links containing the words: **"Stronglock, Arch, Heel, Endicott Johnson."** Footwear. Endicott Johnson Corp., Endicott, N. Y.
419,263. **Allweather.** Windshield wipers. Hackett Automotive Accessories Corp., Providence, R. I.
419,284. **Paisley, Scientific Adhesive Service.** Glue, paste, resin adhesives, and liquid adhesive cement. Paisley Products, Inc., Chicago, Ill.

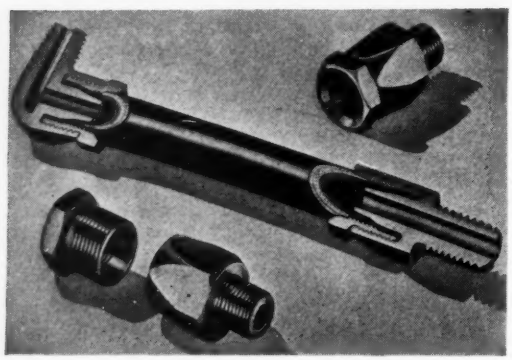
New Goods and Specialties



Pioneer Neoprene-Impregnated Canvas Glove

New Work Glove

A QUALITY canvas work glove, impregnated with oil- and acid-resistant milled neoprene, offers a new type of protection on jobs that are too wet and sloppy for other types of work gloves. According to the manufacturer, the synthetic division of The Pioneer Rubber Co., the milled neoprene used is tougher and more durable than the latex type, thus offering dependable protection and extra-long wear. The impregnating process is such that the canvas and neoprene are joined in a permanent bond, not merely coated, and result in a rough adhesive surface having a non-slip grip, making the glove especially valuable in the handling of wet, slippery objects. Manufactured with both a knit and gauntlet wrist, the glove is furnished in one standard size.



Resistoflex Hose Couplings

Reusable Hose Couplings

NOW available is a complete line of patented attachable-detachable reusable metal couplings which make possible the hand-assembly of flexible hose lines. These two-piece safety seal couplings, properly attached, can be trusted never to let go or vibrate loose. They are easily and quickly attached or detached and can be used over and over again, with end-wrench assembly done on the spot.

The coupling nut threads on to the hose, with the coupling shell compressing the hose end into a safety seal gasket. The fitting has a long, even grip on the hose; the double bell shape of the nut allows the hose to flex without cutting. The heavy body of the fitting prevents crushing or distorting of the line. Unusually large square wrench surfaces make assembly a simple and rapid operation. Resistoflex Corp.

CEYLON

The report of the work of the Rubber Research Scheme (Ceylon) during 1944 reveals that because of the necessities of the war, the chemical department at Dartonfield was active in the production of various rubber articles for essential purposes which could not be readily imported. These goods included a substantial quantity of rubber tubing for use in hospitals and laboratories. In addition, 15,000 pounds of softened rubber were prepared for a local firm by a process developed by the Rubber Research Institute of Malaya. It is believed that this was the first time that the process was used on a commercial scale.

During the year the chemical department also began work in connection with the investigation of the plasticity of rubbers with a view to improving the quality of *Hevea* rubber by selection and breeding. The rubber obtained from a large number of individual trees both in mixed seedling population and the selected material available at Nivitigalakele was examined, and the relation between plasticity and the non-rubber constituents was also studied. When special equipment that has already been ordered arrives, work will be commenced on the relation between plasticity and other properties of technical interest. So far it has been observed that the plasticity of the rubber from a number of individual trees at Dartonfield has remained relatively constant over a period of two years. A correlation coefficient of +0.472 has been found between the plasticities of rubbers from a group of Prang Besar isolation garden seedlings and the clones derived from them by budgrafting.

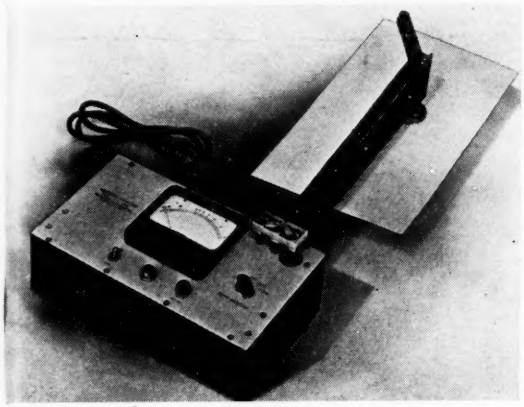
The department also undertook experiments to determine to what extent crepe rubber can be protected against the effects of exposure to sunlight and heat by the addition of chemicals to the latex before coagulation. Samples of crepe containing chemicals were examined (a) after 14 days' storage in the dark (control); (b) 14 days' exposure to the weather; and (c) 10 days' heating in the dark at 70° C.

The results indicated that under the conditions of the test the onset of tackiness can be completely arrested by sulfur (0.05 to 0.1%) and by phenyl Beta-naphthylamine (0.1 to 0.2%); sodium bisulfide gave no protection.

The protective agents could not prevent loss of tensile strength in raw rubber exposed to sunlight. Both sulfur and phenyl Beta-naphthylamine prevented the considerable softening (D 10) of unprotected rubber on exposure to sunlight.

Heating in the dark at 70° C. for ten days had very little effect on hardness and none on tackiness, whether the rubber was protected or not.

New Machines and Appliances



Model S Delmhorst Moisture Detector

Moisture Detector for Material in Sheet Form

THE Colloid Equipment Co. has developed the Model S Delmhorst moisture detector for determining moisture content of materials in sheet form. The use of this instrument is limited to quick determinations, within close accuracy, of moisture contents ranging from 3% to 15%, depending on the material tested.

Sheet material, up to ⅜-inch thickness, is slipped into the deep throated arm of the device, where it is clamped under uniform pressure. Readings are electrical and instantaneous. The meter operates on an 110 volt, 60 cycle A.C., and can be plugged into any such circuit. The meter scale is calibrated in electrical units, which are easily translated into moisture contents by testing several samples of similar material whose moisture contents have been previously determined by the usual standard oven method. The unit is compact and portable and weighs less than 10 pounds.



there are also LEAKS in rubber working



Roll Model

Overheating of calender rolls is one of the causes of scorched rubber . . . that's a leak that can be avoided. It is a simple matter to check the surface temperatures of still and moving rolls with the Cambridge Roll Pyrometer. It is accurate, rugged, quick-acting and convenient to use. Write for bulletin 1948A.

CAMBRIDGE INSTRUMENT CO., INC.
3709 Grand Central Terminal, New York 17, N. Y.

The roll model is for checking temperature of still or moving rolls, the needle-type for within-the-mass, the mold-type for reaching into mold cavities.

CAMBRIDGE
Roll • Needle • Mold
PYROMETERS

DON'T TAKE A Chance WITH QUALITY IN YOUR TIRES



Specify Armour's Neo-Fat Fatty Acids

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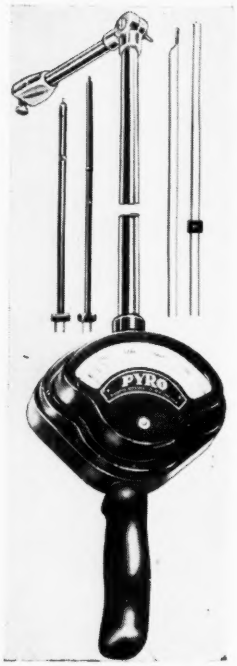
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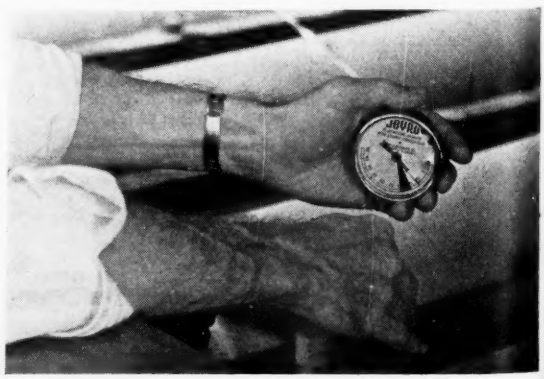
THE Pyrometer Instrument Co. has developed a new Pyro immersion pyrometer, specifically designed for the nonferrous industry and embodying numerous improvements enhancing ruggedness, dependability, accuracy, and ease of operation. The design includes a large 4-¾-inch indicator with a four-inch direct reading scale calibrated from 0-1500° F., or 0-2500° F., or equivalent Centigrade range. Two models with overall lengths of 27 and 43 inches are manufactured, both having a specially designed swivel eight inches from the connector block which permits use of the pyrometer at any angle. The swivel is equipped with toothed notches to prevent its loosening during operation. The instrument can be used with interchangeable thermocouples of either the "bare metal" or "protected" types.

The thermo-electric system is constructed with a permanent magnet, low resistance type galvanometer, has an internal automatic cold end compensator in addition to an external adjusting screw, and is enclosed in a shock-, moisture-, and dust proof steel case. This housing assures fullest protection of the system from possible demagnetization, or interference from magnetic surroundings.

Roller Pressure-Pull Indicator

A NEW and improved model of the widely used Joyro pressure-pull indicator for rollers is now available. Said to be the only indicator of its kind on the market, it consists of a flat, watch-spring steel strip connected to a special tensionometer with a reading dial. The end of the spring, when inserted between a pair of rollers, registers on the dial the amount of pressure and pull being exerted by those rollers and is therefore valuable in adjusting rollers to a predetermined degree of pressure and pull.

If a reading on the dial is taken when rollers are operating properly, those same rollers can be adjusted to an identical dial reading at any future time and will exert an identical pressure and pull. The amount of time saved by this method is considerable, and the method is much more accurate than rule-of-thumb methods. Another advantage is the fact that the indicator can be used to check pressure-pull across the entire length of a set of rollers by simply taking different readings at regularly spaced intervals. George Rosales Co.



Joyro Pressure-Pull Indicator for Rollers

EUROPE

GREAT BRITAIN

Franklin Heads I.R.I.; Other Officers Elected

The twenty-fourth annual general meeting of the Institution of the Rubber Industry was held in London on March 8; the retiring president, Lt.-Col. Sir Walrond Sinclair, presided. On this occasion H. W. Franklin, for many years honorary treasurer of the I.R.I., was elected president for the year 1946-47. Mr. Franklin, chairman and managing director of J. G. Franklin & Sons, has been in the rubber industry for 50 years, during 25 of which he has been closely connected with the I.R.I. He is also chairman of the Surgical Rubber Manufacturers' Association and was recently appointed vice president of the Federated British Rubber & Allied Manufacturers' Association.

At the same time the following ten ordinary members of Council were elected: T. A. Beazley, development engineer, British Tire & Rubber Co., Ltd.; S. Buchan, chief chemist, Andre Rubber Works, Ltd.; C. W. Buckles, chief chemist, Pirelli-General Cable Works, Ltd.; J. W. Denson, rubber technologist, Goodyear Tire & Rubber Co. (G.B.), Ltd.; L. E. Masheter, tire technical superintendent, Dunlop Rubber Co., Ltd.; C. R. Pinnell, chief chemist, Wm. Warne & Co., Ltd.; J. G. Robinson, deputy process manager, British Insulated Callender's Cables, Ltd.; A. Ryan, managing director, Ioco, Ltd.; P. Schidrowitz, general manager, Lea Bridge Rubber Works, Ltd.; R. J. Tudor, chief chemist, India Rubber, Gutta Percha & Telegraph Works Co., Ltd.

The vice presidents elected for 1946-47 include: F. D. Ascoli, T. B. Barlow (chairman Rubber Growers' Association), Sir G. Beharrell, Col. J. Sealy Clarke, H. C. Coles, H. A. Daynes, A. Johnston, F. Jones, L. V. Kenward, Sir E. Macfadyen, P. S. Martin (chairman Rubber Trades Association of London), H. E. Miller, H. G. Montgomery, W. J. S. Naunton, S. S. Pickles, H. Rogers, Dr. Schidrowitz, J. R. Scott, Sir Walrond, D. F. Twiss, G. Leslie Wates (chairman, The Cable Makers Association), D. F. L. Zorn.

The new honorary treasurer is F. M. Panzetta.

The meeting was followed by the annual dinner, the first held since 1939, at which the former president, Sir Walrond, talked of the new president and the work of the Institution of the Rubber Industry. The speaker stated that the Institution had, besides the London Section, six provincial sections, of which four had been able to carry on during the war. Recently another section was formed in Southampton, while outside of the United Kingdom, there was the new Australian section, and in India an advisory committee had been set up.



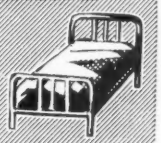
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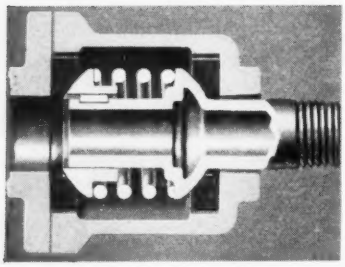


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Later the new president presented the Colwyn Medal for 1943, 1944, and 1945 to A. Healey, S. A. Brazier and Dr. Naunton, respectively. Since it had not been possible to purchase gold, the medals were made of bronze. Mr. Healey received his medal for work with the Rubber Control in developing the use of synthetic rubber. Mr. Brazier, chairman of the technical committee of the F.B.R.A.M.A., helped the industry adjust itself to the changes occasioned by the use of synthetic rubber; while Dr. Naunton had given invaluable aid and advice on all educational matters coming before the Institution and the Council.

The I.R.I. Council, which already grants part-time scholarships, now proposes to award full-time scholarships in rubber technology, and those qualifying will be enabled to take the three-year associateship course of the Institution at the Northern Polytechnic, London. The scholarships will have a maximum value of £100 a year, that is to say, £34 plus a maintenance grant up to £66, according to individual needs.

To Promote Industry and Export

In the House of Commons recently H. A. Marquand, Parliamentary Secretary to the Department of Overseas Trade, announced that the Board of Trade and the British Export Trade Research Organization will cooperate to give British exporting firms an overseas service which will make available to them the fullest information necessary for building up British trade abroad. The Board of Trade will secure its information from commercial diplomatic officers and trade commissioners, who are to submit general reports and economic reviews continuously. The B.E.T.R.O. will engage specially trained observers whose reports will supplement those of the Board of Trade. A joint committee has been agreed upon to insure that there will be no duplication, to review results, and to arrange programs. All information obtained by the B.E.T.R.O. will be reserved for its members, but the Board of Trade will disseminate its findings widely.

A special committee, headed by Sir Clive Baillieu, president of the Federation of British Industries, has recommended the establishment of a British Institute of Management, and Sir Stafford Cripps, president of the Board of Trade, has announced that he is in full agreement with this proposal. He added that the treasury will grant up to £150,000 over the first five years to supplement contributions from members and from industry and thus give the project a favorable start.

The British Institute of Management will take all possible steps to help raise the standard of management practice in the country and to this end will provide a center for the study of management, will carry out research and give out information on the subject, will encourage and advise on schemes of training in management, and cooperate closely with all existing management bodies which are effective in their own specialist fields. The government is to appoint the first council.

With a view to securing for British industry the best industrial intelligence from Germany, the government has decided to bring over about 200 German scientists and technicians to work here in a purely advisory capacity for a limited period. Exceptionally brilliant research workers and specialists in industrial techniques or processes likely to be of great value or interest to British manufacturers will be selected, and will have to be volunteers. The British Government will be the employer and will loan experts to trade associations and research organizations; all eventual inventions and discoveries will be used for industry as a whole. It is emphasized that no German worker will hold a position of authority, or will he replace a British worker.

Having decided that the present state of the natural rubber industry and the need of finding new markets necessitated intensified applied research, the Board of British Rubber Producers' Research Association set out to find a man qualified to carry out this part of its work. It is now announced that C. W. Long has been appointed superintendent of applied research, to work under and in close collaboration with the director of research of the B.R.P.R.A., and to supervise a technological department (in charge of E. Rhodes), a development department (in charge of G. F. Bloomfield), and an engineering department (in charge of B. Lambert). Dr. Long received his training at Birmingham University under Prof. R. N.

HYDRAULIC PRESSES BY Farquhar



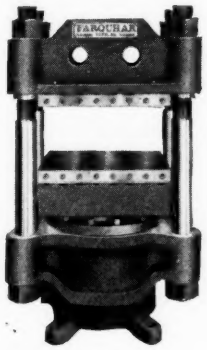
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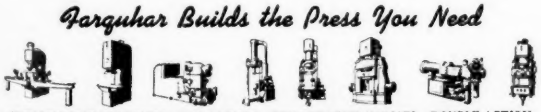
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Haworth, vice chairman of the B.R.P.R.A., and has varied experience including that connected with designing, planning, and operating chemical plants. He was among the chemists operating for the B.R.P.R.A. a pilot-plant for rubber hydrochloride.

The Ministry of Supply announced in March that a committee had been formed of representatives of producers, distributers and manufacturers of rubber in England together with officials of the government departments concerned. The committee is to facilitate preparatory discussion of subjects likely to be raised at meetings of the International Rubber Study Group and other matters of concern to the industry.

Controversy Over Price of Malayan Rubber

The disparity in prices fixed respectively for Malayan and Ceylon rubber has for some time been the subject of frequent and acrid discussion in the House of Commons. The price of Malayan rubber had been fixed at 20¼c, U. S. currency, per pound to the end of March, while that of Ceylon rubber will remain at 1s. 6d. until the end of September, 1946. Members complained that the price of Malayan rubber had been decided on without consulting rubber producers and that it failed to cover the cost of production. They were particularly bitter on the point that the British Government sold Malayan rubber to the United States at little above the 1940 levels, while the United States was obtaining from Britain 140% and 110% over prewar prices on cotton and tobacco.

The government's explanation: that the price was fixed for rubber in stock; that very little rubber was being produced in Malaya, none of it from large estates; and that such small growers as were producing appeared to be satisfied with the price, failed to satisfy various members.

It is clear that the acerbity of utterances is due not only to anger at the loss of dollars resulting from the low price and to the suspicion that the present government has allowed itself to be stampeded into hasty decision through lack of knowledge and experience of international bargaining and trade, but also to fear of the unfavorable impression that might be produced on native planters when the price of rubber is shortly raised, as it will have to be, once production on the European estates gets under way.

The opinion was expressed that the price of Malayan rubber should have been around 1s. 8d. a pound so as to cover the present cost of production and labor estimated to have risen at least 100% above the average prewar cost of 7d. a pound in Malaya, in addition to about 3d. a pound that will have to be paid toward rehabilitating the industry, and another 3d. per pound as margin on the prewar price.

Discussing the political and economic aspects of the price question in a recent issue of *The India Rubber Journal*, a Member of Parliament, D. Gammans, states that the European plantation industry in the East is faced with three immediate and three long-term problems.

The first short-term problem, he says, is to see that so long as controls remain, the price to the producer is fixed at a figure which will cover the real cost of production, and the increased salaries and wages, with some margin for making good the damage done during the Japanese occupation.

The second is the shortage of labor caused by the appalling death toll of Indian and Chinese labor taken by the Japanese to work on the Burma railway. The attitude of the Indian Government on free immigration from Madras is uncertain so that other sources of labor might have to be considered. In any case it is clear that for some time to come labor will be the limiting factor in production.

The third problem is that of compensation for damage to buildings and trees resulting from the Japanese invasion.

The first long-term problem, says Mr. Gammans, is the relation of natural rubber to the vast synthetic rubber industry built up during the war in the United States. He expects the American buyer to use the threat of synthetic rubber to bluff the British Government into the type of horse-trading transaction "at which the Americans are adept." He implies that the threat of synthetic rubber is not really very serious.

The second long-term problem is the encouragement of research into new uses for rubber and "the absolute

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necessity for the plantation industry to devote more attention to higher yields and technical progress generally." He adds that most tropical crops started by Europeans have gradually become smallholders' products because of the lower cost of production of the native grower, and he feels that rubber, which is far easier to exploit than most tropical crops, will go the same way unless the plantation industry always keeps one jump ahead in technical research.

Finally, European capitalistic enterprises must establish a proper relation in a tropical country in which they wish to operate if friction and misunderstanding are to be avoided.

British Rubber Industry Notes

Czechoslovak Bata Co., Ltd., was recently formed to carry on the business of importers, exporters, and wholesale dealers for rubber boots and shoes, footwear of all kinds, textiles, rubber goods, tools, and all products sold or used by the Bata Shoe Co. of Ziln, Czechoslovakia, or elsewhere.

The Anchor Chemical Co., Ltd., announced at the annual general meeting its decision to form a subsidiary in America. As soon as arrangements can be made, A. Grundy, appointed general manager of the new enterprise, is to leave for the United States. The company also reported another good year, with net profits of £19,336 in 1945, against £19,289 in 1944.

Dunlop Rubber Co., Ltd., is reportedly preparing to make latex foam cushioning in a separate factory at Walton, Liverpool.

News of the Plastics Industry

New plastics concerns recently organized include E. H. Kraus Plastics, Ltd., capitalized at £30,200, and Arro Plastics, capitalized at £25,000.

The De La Rue concern has acquired a license to manufacture plastic decorative material according to the process of the American Formica Insulation Co. The material, to be marketed under the name Delaron, is to be the chief product manufactured at the De La Rue's new factory at Tynemouth, which is scheduled to begin operations in July.

The government factory at Rawtenstall has been allocated to I.C.I. (Plastics), Ltd., and is to be used for the production of the plastic Perspex. It is expected to employ 450 persons.

Plastonal, Ltd., manufacturer of synthetic resins, has increased the nominal capital of £1,000 to £15,000 by the addition of £14,000 in £1 shares.

British Industrial Plastics reports gross profits of £280,681 for the year ending September 30, 1945. After various deductions net profits of £23,516 remained, and a dividend of 8% was again turned out, leaving £12,594 to be carried forward.

Under the certification scheme recently drawn up by the Mark Committee of the British Standards Institution in collaboration with the British Plastics Federation, manufacturers of plastic materials and products thereof which conform to B. S. Standards will be able to obtain a license permitting them to use a certification mark. Purchasers of plastics and plastic moldings will thus be enabled to select products of recognized standard as to material and workmanship. At present specifications have been issued for moldings only (among plastic goods); specifications for other articles will follow in due course, but naturally it is not intended to work out specifications for every type of article made of plastics, which would hardly be feasible in any case.

FRANCE

Experiments in Coloring Polyvinyl Chloride Masses

The problem of finding dyes and pigments suitable for coloring polyvinyl chloride masses has been made the subject of an investigation by Francois Gournay at the Manufacture des Glaces et Produits Chimiques de Saint-

Gobain, Chauny et Cirey.[1] The investigation falls into three parts: the natural affinity of colors for polyvinyl chloride masses; the uniformity of their diffusion in these masses, and their resistance to light and heat; and finally, the behavior of pigments.

In the first part of the study, M. Gournay attempts to verify the hypothesis that the affinity of a color is the result of a plasticizing or solvent action and that consequently dyes that include plasticizing groups for polyvinyl chloride, like —NO_2—, the halogens, —CO— (ketonic) and nuclear tertiary amines, would have a good affinity; while colors that are acid in character, particularly those containing several sulfonic groups, would be less effective unless they contained other more favorable groups.

The structure of the different colors proved an important factor for their relative affinity for polyvinyl chloride. Thus nitrated colors, oxyazos (with a few exceptions), polyazos, hydroazos, derivatives of quinoline and sulfur dyes have a very poor affinity.

Amidazo and oxyquinone dyes derived from diphenylmethane are fairly good, but the best results in coloration were obtained from aminoquinones (derivatives of anthroquinone), of triphenylmethane (especially the chlorides) derivatives of phthalein and of quinone-imide. Acidity or basicity does not appear to affect the fixing of colors. Comparisons of the effect of functional groups are rather deceptive. Thus the presence of nitrated groups in nitrated colors confers no special properties. As to the halogens, cibanone G blue, which has two bromine atoms, is the only anthraquinone dye which does not color polyvinyl chloride. By contrast, chlorinated derivatives of triphenylmethane, for instance, are somewhat superior to the derivatives of the base. Similarly eosine, the rhodamines and the chloride derivatives of quinone-imide give good color.

In the case of the indigotine derivatives, the solvent power is found to decrease with the accumulation of halogens on the same molecule. Thus indigo blue does not yield good results, but its dibromine derivative, indigo Ciba 2B, dyes well; the tribromine derivative (Ciba blue 2B) gives much poorer results, and the pentabromine derivative, Ciba blue G, is downright bad.

Ketonic groups are found only in the amino and oxyanthraquinones, and these usually yield excellent results. The tertiary amines are favorable, but weak, and aminated derivatives of quinoline do not give good results because they include the carboxylic or sulfonic groups, which counterbalance the effect of the amine groups.

Colors proving successful under the initial tests were then incorporated in a mixture of polyvinyl chloride with butyl phthalate as plasticizer, and the diffusion of the colors in the mass was noted as well as the purity of tint, resistance to light (one day and eight days in the sun) and to heat (one hour in the oven at 160° C.) It appears from the experiments that a sufficiently large number of dyes are suitable for making plasticized products, but only a few are useful for work at high temperatures. There proved to be fairly good correlation between the results of the tinting tests and the tests on uniformity of diffusion in the mass. Comparison of results of tests on 100 dyes showed that in all cases except in six where slight differences were noted, and nine where there was no agreement, such correlation exists. In other words the tinting test is helpful in most cases, but it is not permissible to reject a dye solely on the basis of the indications of this test. However, if the class to which a dye belongs is known, and its results in the tinting test differ from those usually obtained with other dyes of this class, its behavior on incorporation in the mass will resemble the general behavior of the class under the conditions. Thus solid chrome brown BC, unlike other colors of the class of azo mordant dyes, gave good results in the tinting test, but on incorporation proved just as mediocre as the other colors of the class.

Unexpected results were also obtained, some of which can be explained in part by the ratio of the sulfonic groups present in the molecule; the presence of impurities in the dyes is also a cause of error.

The effect of other plasticizers besides butyl phthalate was also tested, including tricresylphosphate, benzyl benzoate, and fenchone. Results indicated that the effect of the plasticizer is not negligible, but did not permit the drawing of any general rules, and the only conclusion that could be made was that benzyl benzoate reduces resistance to heat.

[1] Rev. gén. Caoutchouc, 23, 1, 12-16 (1946).

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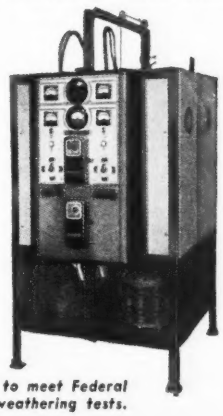
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To obtain opacity when solvent dyes were used, titanium white and antimony oxide were tested, and the latter proved superior, frequently increasing resistance to heat. The covering power of blacks was the determining factor in the selection of these colors, and of several tested, alcohol black B and the base of induline R proved the only ones having sufficient covering power; the former gave the deeper tint, but was less resistant to heat.

In the experiments involving the incorporation of pigments, those that give translucent colors were found to be non-resistant to light; surprisingly enough, few of the many pigments tested showed good resistance to heat, but the conditions of the heat test were admittedly rigorous.

On the basis of the tests, the following classification of the dyes and pigments most suitable for use with polyvinyl chloride was worked out:

COLORS SUITABLE FOR HIGH-TEMPERATURE WORK

Red B for Nitro Varnish	Prussian Blue
Base of Induline R	Chrome Yellow No. 4
Ponceau Oil LB	Chrome Yellow No. 6
Bright Oil Yellow FFS	Oil Orange HA
Superacid Red 3B.	Alizarine Orange Lake
Bright Oil Scarlet R	Aluminum Powder
Vulcafixe Blue S D.	Calcined Alumina

COLORS SUITABLE FOR WORK WITH PLASTICIZED MATERIALS

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Orange for Varnish JN	Barium Sulfate
Red for Varnish 6B	Zinc Oxide
Yellow for Varnish 5 RL Extra	Bronze Powder
Yellow for Varnish 6 B	Green Vulcafixe V
Brown Organol 5 R	Ruby Vulcafixe B
Yellow Organol PC	Blue Vulcafixe R
Yellow Organol 2T	Ultramarine Blue
Orange Vulcafixe R	Bitumen of Judea
Yellow Vulcafixe 2J	Light Cobalt Blue
Red Vulcafixe R	Burnt Sienna
Scarlet Vulcafixe R	Van Dyke Brown
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Chrome Yellow No. 3	Light Cadmium Red
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AUSTRALIA

Sessions of the Australasian Section of the Institution of the Rubber Industry have taken place regularly in Melbourne and Sydney, and during the third quarter of 1945 several meetings were held during which papers on various topics of interest to the local rubber industry were read and discussed. At the July 31 meeting in Melbourne, various speakers gave their views on the subject "Is Rubber Machinery Out of Date?", and the conclusion seemed to be that on the whole rubber machinery is not out of date although improvements are still possible. On August 27, also in Melbourne, W. Hartley and B. T. Dickson, chief of the Division of Plant Industry of the Council of Scientific and Industrial Research, presented a paper on "Rubber Growing in Australia." A paper on "Australian Minerals for the Rubber Industry" presented at a meeting in Sydney on September 20 gave interesting information on the sources of mineral earths in New South Wales and a detailed description of geological formation, particle size, and impurities to be expected.

The Premier of South Australia, Thomas Playford, recently announced that the Firestone Tire & Rubber Co., Akron, O., U.S.A., contemplates the establishment of a tire factory in Adelaide, South Australia, where 600 to 800 men will be employed. The company's Australian representative, Andrew Booth, he added, gave the further information that the company intended also to produce synthetic rubber products later on.

After a three months' tour of the United States and one of four months in Britain, R. N. Sykes, director of the Laminex Co., Melbourne, came to the conclusion that Australia is ahead of Great Britain in methods of manufacturing plastics, but that the United States is about a year ahead of Australia. Laminex Co. is a subsidiary of Australian Consolidated Industries, one of the largest manufacturers in Australia.

Editor's Book Table

BOOK REVIEWS

"Physical Constants of Hydrocarbons. Volume III. Mononuclear Aromatic Hydrocarbons." Gustav Egloff. American Chemical Society Monograph Series—No. 78. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 672 pages. Price $15.

This book is the third of a four-volume work collating and evaluating physical constants of hydracarbons; the first two volumes were published in 1939 and 1940, respectively. The data presented are in tabular form and include melting point, boiling point, specific gravity, index of refraction, and other available pertinent information, in addition to the structural diagram for each compound. Literature references for the constants appear at the end of each chapter. The volume covers aliphatic derivatives and substitutions on alicyclics of the lower and higher phenyls.

In the introduction to the book are sections on history of benzene, organization of compounds, nomenclature, precision and accuracy of data, method of calculation, etc.

The values tabulated in this volume were collected from the literature and unpublished data from Universal Oil Products Co. and other research laboratories. The method used for searching is given to indicate the completeness of the study.

"Rubber Red Book." 1945 Edition, Fifth Issue. Published by *The Rubber Age*, 250 W. 57th St., New York 19, N. Y. Cloth, 6 by 9 inches, 692 pages. Price $5.

Although following about the same system of organization and classification as the 1943 edition, the new biennial issue of the directory of the rubber industry shows expansion of almost every section, with a total increase in pages of 112, including advertisements. Compiled and published under difficult production conditions, the book nevertheless presents a commendable coverage of data and information on the rubber industry. Practically every section of the book is still affected by wartime conditions, and many items as yet unavailable are listed for future reference upon the return of more normal supplies and services. Included in the section on rubber reclaimers is a reprint of the Scrap Rubber Specifications of the Rubber Reclaimers Association, as revised September 21, 1945.

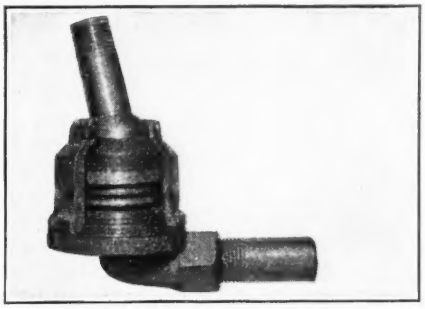
The following are the titles of sections in the book: rubber manufacturers in the U. S., classified alphabetically, by products, and by geographic location; rubber manufacturers in Canada; rubber machinery and equipment, listed by types, with manufacturers' names and addresses; accessories and fittings, with suppliers and their addresses; rubber chemicals and compounding materials, classified by



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"Science and Scientists in the Netherlands Indies." Edited by Pieter Honig and Frans Verdoorn. Board for the Netherlands Indies, Surinam and Curaçao, 10 Rockefeller Plaza, New York, N. Y. Cloth, 7 by 10½ inches, 514 pages, 134 illustrations, maps. Price $4.

The interest in Netherlands India aroused by the war and by recent events is being further stimulated by the highly informative and readable publications that have been offered to the public of late. First Vlekke's "Nusantara" acquainted readers with the cultural and political history of the island; now, the present volume, devoted to the local development of various branches of the natural sciences, helps round out the picture. Compiled under war conditions, the work does not claim to be a complete history of science in Netherlands India; however the various articles, notes, biographical sketches, reviews, etc., it contains offer a wealth of material on which readers of widely divergent interests can profitably draw.

Several of the articles treat of the famous Botanical Gardens at Buitenzorg, established in 1817 and destined, especially under the equally famous director Melchior Treub, to play such an important part in the economics of the islands. Rubber men may recall that at Buitenzorg the first *Hevea* trees to reach Netherlands India were planted, important research work on latex was carried out, and the earliest attempts at budgrafting *Hevea* were made.

Treub came to Buitenzorg in 1883, and the following year he founded the Visitors' Laboratory. A list of the foreign scientists who made use of this facility up to 1934 is given in K. W. Dammerman's article, "A History of the Visitors' Laboratory (Treub Laboratorium) of the Botanic Gardens Buitenzorg, 1884-1934." The development and the scope of the gardens are described, among others, in "Short History of General Botany in the Netherlands Indies" by F. A. F. S. Went and in "Le Jardin Botanique de Buitenzorg et les Institutions de Botanique Appliquée aux Indes Néerlandaises" (in the orginal French) by C. J. Bernard. D. G. Fairchild in "An American Plant Hunter in Netherlands Indies" describes a visit to the Gardens in 1895-1896, when he met Treub and noted that the latter favored *Ficus elastica* over *Hevea brasiliensis* as the future source of plantation rubber.

Other articles deal with climate and soil, peoples, archeology, geology, agriculture, etc. Of the major crops, cinchona, tobacco, and rubber receive special treatment. As to rubber, G. E. Coombes, secretary of the British Rubber Producers' Research Association, discusses "The Organization Devised by the International Rubber Regulation Committee for the Conduct of Research and Propaganda, under the 1934 Agreement between the Governments of France, the United Kingdom, India, the Netherlands, and Siam, to Regulate the Production and Export of Rubber", detailing the organization finally set up and its constituent units and itemizing the research and propaganda programs for 1940 as well as the publications emanating from the laboratories of the British Rubber Producers' Research Association on work conducted to the end of 1943.

"The Work of the West Java Research Institute in Buitenzorg, covering Tea, Rubber and Cinchona" is treated by Ch. Coster. Rubber research included the development of new high-yielding material, botanical and agricultural investigations, latex studies, rubber preparation and plant-pathological investigation. "A History of Rubber Cultivation and Research in the Netherlands Indies", by T. A. Tengwall, gives an excellent survey of the local industry, concise and comprehensive. However one cannot help marveling that not one of the justly famous experiment stations or of the investigators who made them so should be mentioned by name. Elsewhere in the book separate lists of re-

search organizations and research workers make up this lack; may we here suggest that the value of the former would be enhanced if, in the cases where the name gives no clue, the institute's specialty were somehow indicated.

In a chapter "Rambles in Sumatra (1926)", Fairchild speaks with enthusiasm of the experiment stations of the A.V.R.O.S. (General Association of East Coast Sumatra Rubber Planters), in Medan, mentioning also the budgrafting experiments carried out at the time by Heusser.

The work in fine, is richly informative, and it is also lavishly illustrated and handsomely bound.

NEW PUBLICATIONS

Publications of the Standard Chemical Co., Akron, O. **"Plastone . . .** Plasticizer and Peptizer for Synthetic, Natural and Reclaimed Rubbers." 4 pages. The properties of Plastone are given, together with information on its effect as a plasticizer and peptizer and its effect on vulcanized compounds. Also included are recommendations on its use in general practice and a table of laboratory test recipes and results. **"Use of Resinex L-4 in GR-I."** 3 pages. This bulletin describes the use of Resinex L-4 in standard GR-I where a small amount of softener is needed, but minimum breakdown of the sides of the unvulcanized tube is desired. The use of Resinex L-4 in GR-I-70 is also described, where larger quantities of plasticizer are required, without upsetting rate of cure or reducing modulus very markedly. Recipes and properties of vulcanizates are also listed.

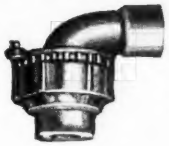
"Perbunan 18." Tentative Supplement No. VI—Special Polymer Section. Stanco Distributors, Inc., New York, N. Y. April 15, 1946. 33 pages. This bulletin gives comparative data on the function and use of Perbunan 18, the newest polymer of the Perbunan family, and Perbunan 26. Tables compare the two rubbers in different types of carbon blacks, giving formulations, curing cycles, and physical properties of the vulcanizates before and after various aging and immersion tests. Included also are tables on the effect of varying amounts of plasticizers on SRF black formulations of Perbunan 18 and 26 on properties of the vulcanizates.

"Indonex Rubber Plasticizers." Bulletin No. 13. Standard Oil Co. (Indiana), Chicago, Ill. March 22, 1946. 52 pages. This bulletin describes the four grades of Indonex now available for use as plasticizers for all types of natural, reclaimed, and synthetic rubbers, in a wide range of applications. Charts and tables show the properties of the Indonex grades, their use in GR-S tread stocks, a comparison with other softeners, their use in carcass compounds, and an investigation of their use in high loadings with carbon blacks in GR-S. In addition are tables comparing these materials with process oil in neoprene and sections giving formulations and properties for their use in various neoprene and Butyl products.

"Rubber." United States Tariff Commission, Washington, D. C. War Changes in Industry Series, Report No. 6. 104 pages. This report on rubber, prepared in answer to requests of Congressional committees, was first issued in September, 1944, and the current edition does not differ substantially from the original report. In the section on world rubber industry in the prewar period appear discussions on the development and status of the industry in the various countries and on rubber prices and international control. The section on war changes in the United States covers imports and stockpiling of natural rubber, the synthetic rubber program, guayule, and the reclaimed rubber industry. The effects of the war on production in foreign areas are also considered. Finally there is a section on the post war situation which covers world consumption and production and the position of the U. S. rubber industry. Numerous tables show productions, exports, consumptions, U. S. synthetic rubber plant locations, capacities, costs, and prices.

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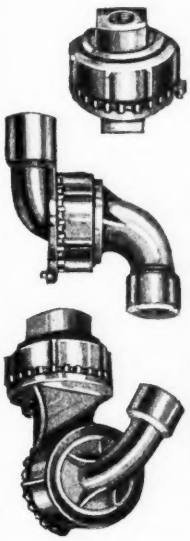
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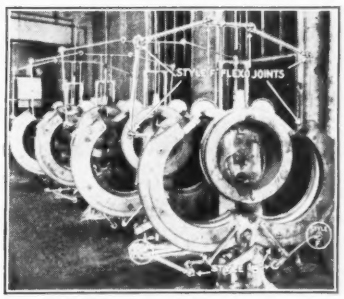
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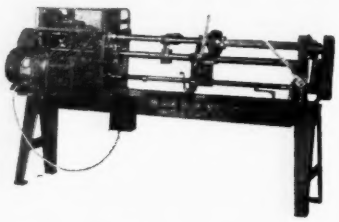


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"Silastic. The Dow-Corning Silicone Rubber." (Silastic Facts No. 1A). Dow Corning Corp., Midland, Mich. March, 1946. 4 pages. This bulletin gives data on the Silastics and information on their applications. Charts show physical, chemical, and electrical properties of molded and extruded Silastic 150, 160, 167, and 180, and Silastic 120 and 125 for coating and laminating.

"Marmix — Reenforcer for Synthetic Rubber Latices." Supplementary Sheet. Marbon Corp., Gary, Ind. The company has issued a supplementary sheet of further tests on the R-11 compound showing improved results over those appearing on page 4 of the original bulletin, reviewed on page 284 of our November, 1945, issue. The R-11 compound includes, as ingredients, GR-S Type 3 latex and Marmix-4950 dispersion.

"Microchemical Services." Foster D. Snell, Inc., 305 Washington St., Brooklyn, N. Y. 8 pages. This bulletin was prepared to summarize briefly the function of a micro-analytical laboratory. After a discussion of the benefits of such analysis, there is a list of micro-analytical services offered by the company. Also included are sections on the organization of the company, other publications available, and the research policy of the organization.

"The Lastex Promoter." Canadian Lastex, Ltd., Montreal, P. Q., Canada. Vol. 8, No. 1. March, 1946. 8 pages. This issue marks the postwar reappearance of the company's trade publication and signals the return of Lastex yarn and products to the Canadian market. A review is given of the general situation in Canada with respect to the production of Lastex yarns, and there are items on personnel changes, sales notes, advertising campaigns, and product applications.

"The Stress-Strain Relation of Natural and Synthetic Rubbers." A. J. Wildschut. Communications of the Rubber Foundaton, Delft, Holland. No. 38, March, 1943. 16 pages. It is shown that Hatschek's formula (better known as Ariano's formula) for the stress-elongation curve of rubber does not hold for normally vulcanized rubber. The observation has been made that the curves for natural and synthetic rubbers up to the breaking point closely follow non-rectangular hyperbolae. The angles between the axis of symmetry of these hyperbolae and the stress axis were measured for pure gum and carbon black mixtures. A general formula has been derived which holds for all rubbers investigated.

"Leadolene." The Brooks Oil Co., Cleveland, O. 12 pages. This bulletin describes Leadolene, a modern lubricant developed to serve new production methods using increased speeds, greater pressures, and high heat conditions. Properties of the lubricant are given, together with information and illustrations of its application in various industrial fields.

"Foamex Cushioning and Mattress Material by Firestone." Firestone Industrial Products Co., Akron, Ohio. 8 pages. This illustrated booklet describes Foamex, the company's foamed latex product, its construction, and properties. Information is given, together with illustrations, of its applications as a cushioning material in household furniture and in theater, car, train and bus seats, and as a mattress for domestic and hospital use.

"Cambridge Surface Pyrometers." Bulletin 194-SA. Cambridge Instrument Co., Inc., 3709 Grand Central Terminal, New York, N. Y. 12 pages. This bulletin illustrates and describes the Cambridge roll pyrometer for determining temperature of readily accessible rolls or other convex surfaces; the extension model for similar surfaces in hard-to-reach locations; the mold pyrometer for mold cavities or stationary surfaces of almost any contour; and the needle model for measuring sub-surface temperature of materials in a plastic or semi-plastic state. Lists of typical applications are given for each model, and illustrations show the instruments in use on a wide variety of production operations in the rubber and related industries.

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Market Reviews

COTTON & FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Feb. 23	Mar. 30	Apr. 6	Apr. 13	Apr. 18	Apr. 27
May	26.42	27.55	28.19	27.43	27.94	27.89
July	26.38	27.55	28.32	27.50	28.00	27.94
Sept.	26.31	27.53	28.37	27.43	27.96	27.95
Dec.	26.25	27.51	28.40	27.32	27.93	27.95
1947						
Feb.	26.23	27.51	28.44	27.34	27.94	27.95
Apr.	26.19	27.54	28.50	27.35	27.99	27.97

THOUGH April saw the highest prices recorded in the cotton market since the 1924-1925 season, heavy liquidation caused wide fluctuations in the day to day closing prices.

The 15/16-inch spot middling price recorded on April 4 was 28.57¢ a pound, it then rose to 28.79¢ a pound on April 6, the high for the month. Following wide fluctuations, the price dropped to the low of the month on April 12 of 27.87¢. The market closed at 28.14¢ a pound on May 2.

The futures market for June finally broke through the 28¢ level, registering 28.11¢ a pound on April 5. The following day the price rose to the month's peak of 28.26¢ a pound, then dropped to 27.38¢ a pound on April 12, finally closing at 27.56¢ a pound on May 2.

Predominant factor causing uncertainty and a wide swing in prices was the fact that though the House passed a bill drastically curtailing the power of the OPA, it is expected that the Senate will modify it since public opinion seems strongly to favor a not so drastically amended price control extension bill.

The strength of the opposition in Congress to the OPA and OES, the improvement in the statistical outlook (the carry-over of free cotton at the end of this season is expected to be the largest since the 1933 season, or about 5,500,000 bales compared with last year's 4,676,000 bales) and the announcement that the Import-Export Bank had signed an agreement with Italy for a $25,006,000 loan to finance the purchase of American cotton, all tended to have a favorable effect upon the market. However the determination of the Administration to have an OPA extension bill adopted without any crippling measures, and the higher margins proposed by Administrator Bowles finally being imposed, which did away with small speculators, tended to dampen the tone of trading.

According to a survey by *The Journal of Commerce*, the forecast of acreage to be planted by cotton farmers has declined 3%, or 500,000 acres, owing to expensive labor and insufficient supply of fertilizer, combined with excessive rains in some areas.

Fabrics

The fabrics market moved uncertainly during April, as mills awaited pending pricing orders and clarification of those already issued. Washington developments indicated a possibility of an extremely cautious position after immediate mill production is scheduled. The fact that the Pace farm parity legislation would not be attached as a rider, but as a separate bill, and the curbing amendments to the stabilization extension act were seen as curbing textile selling activities. If higher raw cotton costs developed quickly, goods would be withheld pending further ceiling increases.

The revision of M-317 and M-317A and related order L-99 provides that producers of specified industrial-type cotton fabrics will set aside a proportion of their second-quarter output to meet vital industrial and agricultural requirements. These fabrics include hose and belting duck, enameling duck and chafer fabrics, osnaburgs, coarse and medium sheeting drills, twills, sateens, jeans, and standard types of print cloths. This action offers relief to manufacturers of industrial belting, rubber tires, vehicles, furniture, bookbinding, and footwear. A total of 228,000,000 yards of cotton fabric, or 9.5% of the estimated second-quarter output, will be reserved for industrial and agricultural requirements. Coating manufacturers were hopeful that this revision would bring forth a better supply of material though the world-wide shortage of oil is hampering their production.

A critical production situation still exists, however, in hose and belting ducks. The production of these fabrics has declined from a total of 48,000,000 pounds in 1943 to 22,000,000 pounds in 1945 and is causing stoppages in rubber company plants.

On April 23 the CPA-OPA issued a joint program which included a new order, M-317C, in an attempt to end yarn diversion by the channeling of production. The program, which includes the new order; L-99 which freezes cotton fabric output; M-317A, channeling supplies of fabrics for industrial and agricultural users and for export; and M-328B, which channels essential fabrics into low-cost clothing, is expected to insure fulfillment of vital cotton textile and clothing requirements through production and distribution controls beginning with the spinning of the yarn and ending with the manufacture of the end-product. Failure by the OPA to bring enamel, hose and belting ducks under the incentive pricing program in an amendment to SO-131, however, threatens to hinder the new program. The situation is so critical that should production of these goods fail to increase, the manufacture of transmission and conveyer belts and the processing of rubber used in the manufacture of tires would be sharply reduced.

The demand for high-tenacity rayon tire yarns continues to mount as automobile production rises. Production increased 75% in 1945 over the 1937-39 figures.

Statistics released by the Bureau of Census on April 3 show that rayon broad woven fabric production during the fourth quarter of 1945 totaled 396 million yards, a 12% increase over the third quarter.

Government statistics reveal that 96,434 thousand pounds of tire cord and fabric were produced in the fourth quarter of 1944; while 116,556 thousand pounds were produced in the corresponding period of 1945. These figures broken down show that the production of cotton cord and fabric totaled 69,972 thousand pounds in the fourth quarter of 1945, an increase of 11,935 over the fourth quarter of 1944; while the production of rayon and nylon tire cord and fabric in the fourth quarter of 1945 amounted to 46,584 thousand pounds, against the 1944 fourth-quarter figure of 38,397 thousand pounds. The production of hose and belting duck fell from 6,079 thousand pounds in the fourth quarter of 1944 to 3,602 thousand pounds in the same period last year.

New York Quotations May 4, 1946

Drills		
38-inch 2.00-yard	yd.	$0.195
50-inch 1.52-yard		.3075
52-inch 1.85-yard		.25293
52-inch 2.20-yard		.2170
59-inch 1.85-yard		.3050
Ducks		
38-inch 2.00-yard D.F.	yd.	.24375
40-inch 1.45-yard D.F.		.31125
40-inch 1.45-yard S.F.		.3239
51½-inch 1.35-yard D.F.		.36125
72-inch 1.05-yard D.F.		.4825
Mechanicals		
Hose and belting	lb.	.5030
Tennis		
51½-inch 1.35-yard S.F.	yd.	.35375
51½-inch 1.60-yard D.F.		.31125
Hollands—Rubber		
20-inch	yd.	.1225/.145
30-inch		.22 /.2575
40-inch		.245 /.29
Osnaburgs		
36-inch 2.94 Cl.	yd.	.1373
40-inch 2.11 P.W.		.1766
40-inch 2.65 Cl.		.15219
40-inch 3.65 Cl.		.11768
Raincoat Fabrics		
Cotton		
Bombazine 64 x 60, 5.35	yd.	.1375
Bombazine 64 x 56, 5.50		.1350
Print cloth, 38½-inch, 64 x 60		.11369
Sheeting, 40-Inch		
48 x 44, 5.00-yard	yd.	.182
64 x 68, 3.15-yard		.15555
56 x 60, 3.60-yard		.13333
44 x 40, 4.25-yard		.10941
Sheeting, 36-Inch		
48 x 44, 5.00-yard	yd.	.96
40 x 40, 6.15-yard		.7804
Tire Fabrics—Karded Peeler		
Builder		
17¼ ounce 60" 23/11 ply	lb.	.48
Chafer		
14 ounce 60" 20/8 ply	lb.	.48
9¼ ounce 60" 10/2 ply	lb.	.45
Cord Fabrics		
25/5/3, 1 1/16" cotton	lb.	.44
15/3/3, 1 1/16" cotton	lb.	.42
12/4/2, 1 1/16" cotton	lb.	.42
23/5/3, 1¼" cotton	lb.	.44
Leno Breaker		
8¼ ounce and 10¼ ounce 60"	lb.	.45

Commodity Exchange, Inc., New York, N. Y., has joined the National Association of Commodity Exchanges & Allied Trades, Inc., bringing to eight the number of commodity exchanges that are members of the association.

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NEW YORK

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Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.035	/$0.04
Rottenstone, domestic	lb.	.025	/ .03

Accelerators, Inorganic

Lime, hydrated, l.c.l., N.Y.	ton	25.00	
Litharge (commercial)	lb.	.085	/ .09
Eagle, sublimed	lb.	.085	/ .09
FBS	lb.	.085	/ .09
Magnesia, calcined, extra light technical	lb.	.25	
Heavy technical	lb.	.05	/ .1275
Extra light U. S. P.	lb.	.26	
Medium light technical	lb.	.12	
Magnesia, light technical	lb.	.25	

Accelerators, Organic

A-10	lb.	.36	/ .42
A-19	lb.	.52	/ .58
A-32	lb.	.59	/ .69
A-77	lb.	.42	/ .55
A-100	lb.	.42	/ .55
Accelerator No. 8	lb.	.63	/ .65
49	lb.	.40	/ .42
552	lb.	1.63	
808	lb.	.59	/ .61
833	lb.	1.13	/ 1.15
Acrin	lb.	.65	
Advan	lb.	.55	
Altax	lb.	.39	/ .41
Arazate	lb.	1.53	
B-J-F	lb.	.34	/ .39
Beutene	lb.	.59	/ .64
Butasan	lb.	1.10	
Butazate	lb.	1.10	
Butyl Eight	lb.	.97	/ .99
C-P-B	lb.	1.95	
Captax	lb.	.34	/ .4275
Cumate	lb.	1.60	
Cuprax	lb.	.60	/ .62
Di-Esterex-N	lb.	.50	/ .57
DOTG (Diorthotolyguanidine)	lb.	.44	/ .46
DPG (Diphenylguanidine)	lb.	.35	/ .41
El-Sixty	lb.	.36	/ .43
Ethasan	lb.	1.10	
Ethazate	lb.	1.10	
Ethylidene Aniline	lb.	.42	/ .43
Ethyl Selenac	lb.	1.60	
Tuads	lb.	1.25	
Tuex	lb.	1.25	
Unads	lb.	1.25	
Formaniline	lb.	.36	/ .37
Goodrite Erie	lb.	.60	/ .62
Guantal	lb.	.39	/ .48
Hepteen	lb.	.34	/ .39
Base	lb.	1.25	/ 1.40
Lead Oleate Witco	lb.	1.75	
Ledate	lb.	1.20	
MBT	lb.	.34	/ .39
MBTS	lb.	.39	/ .44
Methasan	lb.	1.20	
Methazate	lb.	1.20	
Methyl Selanac	lb.	1.60	
Tuads	lb.	1.25	
Monex	lb.	1.25	
Mono Thiurad	lb.	1.25	
Morfex "33"	lb.	.60	/ .65
Novac	lb.	1.40	
O-X-A-F	lb.	.38	/ .43
Pentex	lb.	.74	/ .84
Flour	lb.	.1225	/ .1325
Phenex	lb.	.49	/ .54
Pipazate	lb.	1.53	
Pip-Pip	lb.	1.63	
Polyac	lb.	1.25	
R & H 50-D	lb.	.42	/ .43
R-2 Crystals	lb.	1.55	
Rotax	lb.	.44	/ .46
Safex	lb.	1.15	/ 1.25
Santocure	lb.	.60	/ .67
Selazate	lb.	1.60	
Setsit 5	lb.	.90	
SPDX-G	lb.	.53	/ .58
SRA No. 2	lb.	.53	/ .55
Super-Sulphur No. 2	lb.	.13	/ .15
Tetrone	lb.	1.25	
A	lb.	1.85	
Thiocarbanilide	lb.	.28	/ .33
Thiofide	lb.	.39	/ .46
Thionex	lb.	1.25	
Thiotax	lb.	.34	/ .41
Thiurad	lb.	1.25	
Thiuram E	lb.	1.25	
M	lb.	1.25	
Trimene	lb.	.54	/ .64
Base	lb.	1.03	/ 1.18
Triphenylguanidine (TPG)	lb.	.45	
Tuex	lb.	1.25	
2-MT	lb.	.58	/ .60
Ulto	lb.	.99	/ 1.04
Ureka	lb.	$0.50	/$0.57
Blend B	lb.	.50	/ .57
C	lb.	.48	/ .55
Vulcanex	lb.	.42	/ .43
Z-B-X	lb.	2.45	
Zenite	lb.	.37	/ .39
A	lb.	.42	/ .44
B	lb.	.39	/ .41
Zimate, Butyl	lb.	1.10	
Ethyl	lb.	1.10	
Methyl	lb.	1.20	

Activators

Activex	lb.	.20	/ .22
Aero Ac 50	lb.	.46	/ .52
Barak	lb.	.50	
D-B-A	lb.	1.95	
Delac J	lb.	.50	/ .60
P	lb.	.39	/ .48
Dibenzo GMF	lb.	1.50	
GMF	lb.	1.95	
MODX	lb.	.295	/ .345
No. 2 RM Red Lead	lb.	.10	/ .105
Ridacto	lb.	.20	
SL-20	lb.	.1089	/ .1135

Alkalies

Caustic soda, flake, Columbia (400-lb. drums)	100 lbs.	2.50	
Liquid, 50%	100 lbs.	1.75	
Solid (100-lb. drums)	100 lbs.	2.10	

Antioxidants

AgeRite Alba	lb.	1.95	/ 2.05
Gel	lb.	.52	/ .54
H.P.	lb.	.53	/ .55
Hipar	lb.	.61	/ .63
Powder	lb.	.40	/ .42
Resin	lb.	.43	/ .45
D	lb.	.40	/ .42
Stalite	lb.	.40	/ .42
White	lb.	1.23	/ 1.33
Akroflex C	lb.	.53	/ .55
Albasan	lb.	.69	/ .74
Aminox	lb.	.40	/ .49
Antox	lb.	.54	/ .56
Aranox	lb.	1.95	
Betanox	lb.	.43	/ .52
B-L-E	lb.	.40	/ .49
Powder	lb.	.61	/ .70
B-X-A	lb.	.43	/ .52
Copper Inhibitor X-872-A	lb.	1.15	
Flectol H	lb.	.40	/ .47
Flexamine	lb.	.53	/ .62
Neozone (standard)	lb.	.61	/ .63
A	lb.	.40	/ .42
C	lb.	.43	/ .45
D	lb.	.40	/ .42
Distilled	lb.	.45	/ .47
E	lb.	.61	/ .63
Oxynone	lb.	.77	/ .90
Parazone	lb.	.68	
Perflectol	lb.	.53	/ .60
Permalux	lb.	1.18	/ 1.20
Santoflex B	lb.	.40	/ .47
BX	lb.	.54	/ .61
Santovar-O	lb.	1.15	/ 1.40
Santowhite	lb.	1.23	/ 1.38
Solux	lb.	1.28	/ 1.30
Stabilite	lb.	.48	/ .50
Alba	lb.	.69	/ .74
Thermoflex	lb.	1.18	/ 1.20
A	lb.	.61	/ .63
C	lb.	.54	/ .56
Tysonite	lb.	.165	/ .1725
V-G-B	lb.	.43	/ .52

Antiscorch Materials

Cumar RH	lb.	.105	
E-S-E-N	lb.	.34	/ .39
R-17 Resin (drums)	lb.	.1075	
RM	lb.	1.25	
Retarder W	lb.	.36	
Retardex	lb.	.445	/ .475
U-T-B	lb.	.34	/ .39
Vultrol	lb.	.50	/ .55

Antiseptics

Compound G-4	lb.	.95	/ 1.40
G-11	lb.	4.50	/ 4.75
Resorcinol	lb.	.64	

Antisun Materials

Antisol	lb.	.23	/ .28
Heliozone	lb.	.23	/ .24
S.C.R.	lb.	.32	/ .34
Sunproof	lb.	.2275	/ .2775
Jr.	lb.	.1625	/ .2125

Blowing Agents

Unicel	lb.	.50	

Brake Lining Saturant

B.R.T. No. 3	lb.	.0175	/ .0185

Carbon Black

Conductive Channel—CC

Conductex A	lb.	.05	/ .085
Continental R20	lb.	.0455	
R40	lb.	.105	/ .14
Huber 35-C	lb.	.075	
Spheron C	lb.	.0455	
I	lb.	.0405	
N	lb.	.15	
Voltex	lb.	.105	/ .14

Hard Processing Channel—HPC

Continental F	lb.	$0.05†	/$0.0725
Huber HX	lb.	.05†	/ .0725
Kosmobile S/Dixiedensed S.	lb.	.05†	/ .0725
Micronex Mark II	lb.	.05†	/ .0725
Spheron No. 4	lb.	.05†	/ .0725
Witco 6	lb.	.05†	/ .0725

Medium Processing Channel—MPC

Arrow	lb.	.05†	/ .0725
Continental A'	lb.	.05†	/ .0725
Huber TX	lb.	.05†	/ .0725
Kosmobile S-66/Dixiedensed S-66	lb.	.05†	/ .0725
Spheron No. 6	lb.	.05†	/ .0725
Standard Micronex	lb.	.05†	/ .0725
Witco 1	lb.	.05†	/ .0725

Easy Processing Channel—EPC

Continental AA	lb.	.05†	/ .0725
Kosmobile 77/Dixiedensed 77	lb.	.05†	/ .0725
Micronex W-6	lb.	.05†	/ .0725
Spheron No. 9	lb.	.05†	/ .0725
Witco 12	lb.	.05†	/ .0725
Wyex	lb.	.05†	/ .0725

Conductive Furnace—CF

Statex A	lb.	.08	/ .10
Sterling I	lb.	.09	

Fine Furnace—FF

Statex B	lb.	.07	/ .09

High Modulus Furnace—HMF

Continex	lb.	.16	
Kosmos 40/Dixie 40	lb.	.05	/ .075
Modulex	lb.	.05	
Philblack A	lb.	.05	/ .06
Statex 93	lb.	.05	/ .075
Sterling L	lb.	.05	

Semi-Reenforcing Furnace—SRF

Continex	lb.	.035	/ .055
Furnex	lb.	.035	/ .06
Gastex	lb.	.035	/ .06
Kosmos 20/Dixie 20	lb.	.035†	
Pelletex	lb.	.035	/ .06
Sterling	lb.	.035†	
Witco	lb.	.035	/ .055

Fine Thermal—FT

P33	lb.	.04	

Medium Thermal—MT

Thermax	lb.	.0225	

Colors

Black

Lampblack (commercial), l.c.l.	lb.	.12	/ .14

Blue

Du Pont	lb.	.90	/ 3.95
Toners	lb.	.30	/ 3.50

Brown

Mapico	lb.	.1135	

Green

Chrome	lb.	.25	
Oxide (freight allowed)	lb.	.25	
Chromium Hydroxide	lb.	.70	
Du Pont	lb.	1.10	/ 2.85
Guignet's (bbls.)	lb.	.70	
Toners	lb.	.35	/ 4.00

Orange

Du Pont	lb.	2.35	/ 3.05
Toners	lb.	.30	/ 1.50

Red

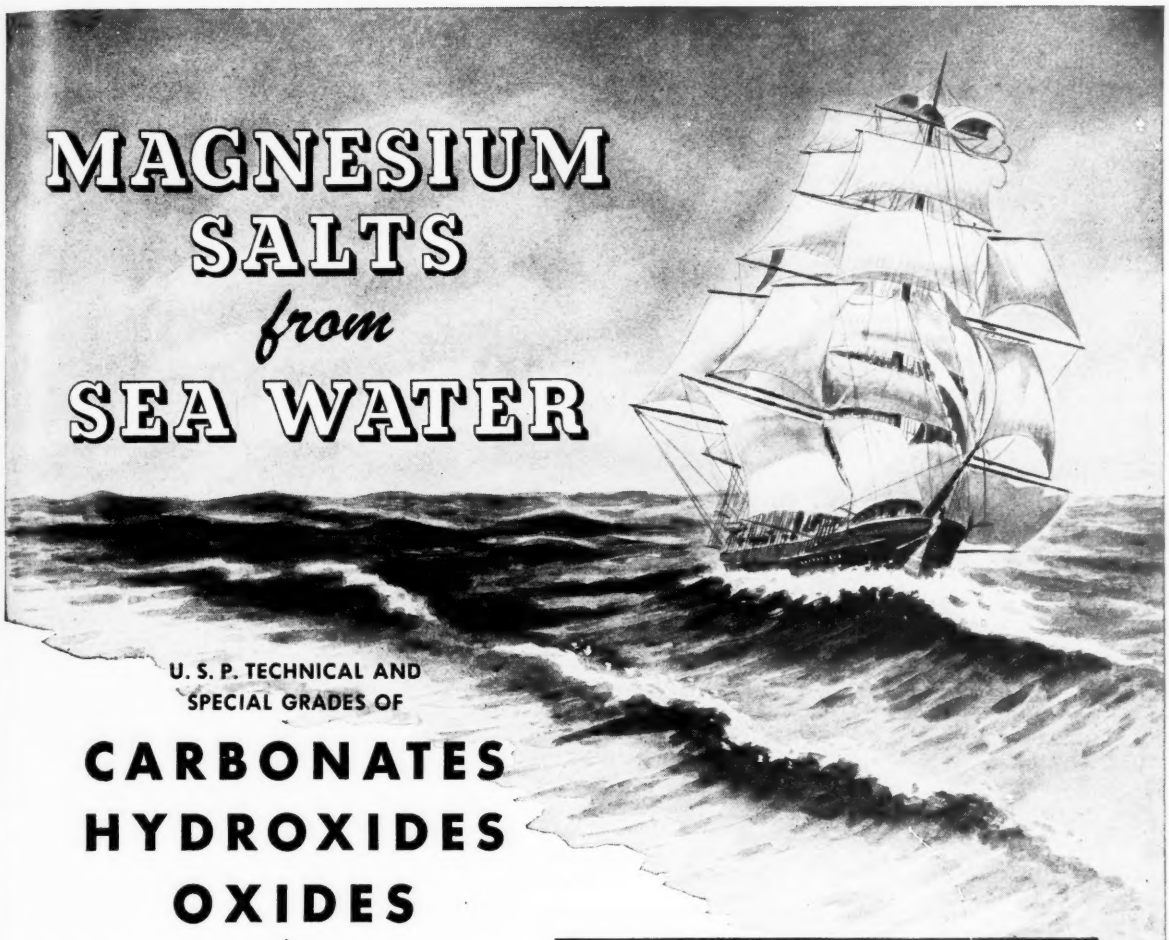
Antimony Crimson, 15/17%	lb.	.48	
R.M.P No. 3	lb.	.48	
Sulphur free	lb.	.52	
7-A	lb.	.37	
Z-2	lb.	.25	
Du Pont	lb.	.48	/ 1.65
Iron Oxide, l.c.l.	lb.	.07	/ .15
Mapico	lb.	.0885	/ .096
Rub-Er-Red (bbls.)	lb.	.0975	
Toners	lb.	.25	/ 4.15

White

Lithopone (bags)	lb.	.0425	/ .045
Albalith	lb.	.0425	/ .045
Eagle	lb.	.0725	/ .0750
Titanium Pigments			
Raycal	lb.	.055	/ .0575
Rayox LW	lb.	.145	/ .1525
R-110	lb.	.155	/ .1625
Titanox-A LO and MO	lb.	.145	/ .15
C	lb.	.055	/ .0575
Zopaque (50-lb. bags)	lb.	.145	
Zinc Oxide			
Azo ZZZ-11	lb.	.0725	/ .075
44	lb.	.0725	/ .075
55	lb.	.0725	/ .075
66	lb.	.905	/ .0975
Eagle, lead free	lb.	.0725	/ .0750
French Process, Florence			
Green Seal-8	lb.	.09	/ .0925
Red Seal-9	lb.	.085	/ .0875
White Seal-7	lb.	.095	/ .0975
Kadox, Black Label-15	lb.	.0725	/ .075
No. 25	lb.	.085	/ .0875
72	lb.	.0725	/ .075
Red Label-17	lb.	.0725	/ .075
Horse Head XX Special 3	lb.	.0725	/ .075
XX Red-4	lb.	.0725	/ .075
78	lb.	.0725	/ .075
156	lb.	.0725	/ .075
166	lb.	.0725	/ .075
St. Joe (lead free)			
Black Label	lb.	.0725	/ .075
Green Label	lb.	.0725	/ .075
Red Label	lb.	.0725	/ .075
U.S.P. No. 12	lb.	.105	/ .1075
Zinc Sulphide Pigments			
Cryptone ZS No. 800	lb.	.0825	/ .085

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed, and those readers interested should contact suppliers for spot prices.

†Price quoted is f.o.b. works (bags). All prices are carlot.



MAGNESIUM SALTS *from* SEA WATER

U. S. P. TECHNICAL AND SPECIAL GRADES OF

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HYDROXIDES
OXIDES

for

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Yellow
Du Pont ..... lb. $1.37 /$1.75
Mapico ..... lb. .0685/ .071
Toners ..... lb. .50 / 1.37

Dispersing Agents
Bardex ..... lb. .0425/ .045
Bardol ..... lb. .02 / .0275
B ..... lb. .05 / .0525
Darvan No. 1 ..... lb. .155 / .30
2 ..... lb. .19 / .30
Nevoll (drums, c.l.) ..... lb. .02 / .025
Triton R-100 ..... lb. .12 / .25

Extenders
Advagum 1098 ..... lb. .42
1198 ..... lb. .40
Dielex ..... lb. .055 / .06
Alba ..... lb. .45
Extender 15 ..... lb. .32
Extender C ..... lb. .15
Naftolen R-100 ..... lb. .11 / .12
Oroplast H ..... lb. .1125/ .1175
L ..... lb. .0725/ .0825
M ..... lb. .0825/ .0925

Fillers, Inert
Asbestos Fiber ..... ton 15.50 /48.00
Barytes ..... ton 25.55 /40.00
Off color, domestic ..... ton 29.00
White, domestic ..... ton 38.50 /40.00
Blanc fixe, dry, precip ..... ton 80.00
Calcene T ..... ton 37.50 /45.00
Kalite ..... ton 26.00
Kalvan ton100.00
Magnesium carbonate l.c.l. lb. .0625/ .075
Pyrax A ..... ton 10.00
W.A. ..... ton 11.50
Whiting
Suprex White (precipitated calcium carbonate) ..ton 32.50
Witcarb R-12 ..... ton 32.50
Witco, c.l. ..... ton 6.50

Finishes
Mica, l.c.l. ..... lb. .045 / .055
Rubber lacquer, clear ..... gal. 1.00 / 2.00
Colored ..... gal. 2.00 / 3.50
Shoe Varnish ..... gal. 1.45
Talc ..... ton 25.00 /35.00

Flock
Cotton flock, dark ..... lb. .095 / .112
Dyed ..... lb. .45 / .85
White ..... lb. .12 / .20
Fabrifil X-24-G ..... lb. .095
X-24-W ..... lb. .135
Filfloc 6000 ..... lb. .16
F-40-9000 ..... lb. .105
Rayon flock, colored ..... lb. 1.00 / 1.50
White ..... lb. .75 / 1.25

Latex Compounding Ingredients
Accelerator 89 ..... lb. 1.20
122 ..... lb. 1.30
Advawet ..... lb. .46
Aerosol (drums) ..... lb. .35
Antox, dispersed ..... lb. .54
Aquarex BBX Conc. ..... lb. .70
Areskap No. 50 ..... lb. .18 / .24
100, dry ..... lb. .39 / .51
Aresket No. 240 ..... lb. .16 / .22
300, dry ..... lb. .42 / .50
Aresklene No. 375 ..... lb. .35 / .50
400, dry ..... lb. .51 / .65
Black No. 25, dispersed ..... lb. .22 / .40
Casein ..... lb. .24 / .2475
Collocarb (Dispersed Wyex) lb. .06 / .07
Copper Inhibitor X-872 ..... lb. 2.25
Darvan No. 1 ..... lb. .30 / .34
2 ..... lb. .30 / .34
Dispersex No. 15 ..... lb. .11 / .12
20 ..... lb. .08 / .10
Factex Dispersion A ..... lb. .185
Marmix ..... gal. 1.35 / 1.75
Micronex, Colloidal ..... lb. .06 / .07
Nevilloid C-55 ..... lb. .12
pHR ..... lb. 1.25
Resin V ..... lb. .13
Santomerse D ..... lb. .41 / .65
S ..... lb. .11 / .25
Sodium Stearate ..... lb. .40
Stablex A ..... lb. .90 / 1.10
B ..... lb. .70 / .90
C ..... lb. .40 / .50
Sulphur, dispersed No. 2 ..lb. .08 / .12
Tepidone ..... lb. .63
Zinc oxide, dispersed ..... lb. .12 / .15

Mineral Rubber
Black Diamond, l.c.l. ..... ton 25.00 /30.00
B.R.C. No. 20 ..... lb. .0105/ .0115
Hydrocarbon, Hard ..... ton 25.00 /27.00
Lode ..... lb. .04 / .045
MilliMar ..... lb. .055
Parmr ..... ton 21.00 /29.00
Pioneer, c.l. ..... ton 25.00 /30.00
Witco MR solid ..... ton 25.00
Granular ..... ton 30.00

Mold Lubricants
Aluminum Stearate ..... lb. .23 / .24
Aquarex D ..... lb. .60
MDL Paste ..... lb. .25
Colite ..... gal. .90 / 1.15
Dipex ..... lb. .1275/ .15
Glycerized Lubricant (concentrate) ..... gal. 1.50
Lubrex ..... lb. .25 / .30
Rubber-Glo, conc. regular gal. .94 / 1.15
Type W ..... gal. .99 / 1.20
Sericite ..... ton 65.00
Soapstone, l.c.l. ..... ton 15.00 /35.00
Zinc stearate ..... lb. .30 / .31

Reclaiming Oils
B.R.V. ..... lb. .03 / .0375
BWH-1 ..... lb. .10
C-10 ..... gal. .19 / .24
D-4 ..... gal. .17 / .22
E-5 ..... gal. .15 / .20
No. 1621 ..... lb. .016 / .0235
S.R.O. ..... lb. .015 / .0225
Wilcor III ..... gal. .26 / .30
151 ..... gal. .26 / .30
X-60 (reclaiming) ..... gal. .20 / .28
X-443 ..... gal. .20 / .27

Reenforcers, Other Than Carbon Black
Buca ..... ton 40.00
Carbonex Flakes ..... lb. .03 / .035
S ..... lb. .031 / .036
Plastic ..... lb. .031 / .0335
Clays
Aerfloted Hi-White ..... ton 10.00
Paragon ..... ton 10.00
Suprex ..... ton 11.00 /23.50
Aluminum Flake ..... ton 20.25 /24.50
Catalpo, c.l. ..... ton 30.00
Champion ..... ton 11.00 /23.50
China ..... ton 25.00
Crown ..... ton 11.00 /23.00
Dixie ..... ton 11.00
Hydratex R ..... ton 20.00
"L" ..... ton 10.00
Langford ..... ton 8.50
Magnolia ..... ton 10.00
McNamee ..... ton 10.00
No. 33 ..... ton 30.00
Par ..... ton 11.00
Paraforce, c.l. ..... ton 50.00
Witco, Nos. 1 and 2, c.l. ton 25.00
Cumar EX ..... lb. .0525
MH ..... lb. .065 / .1175
V ..... lb. .0975/ .1275
465 Resin ..... lb. .035
"G" Resin ..... lb. .08
Nevindene ..... lb. .105 / .135
Resinex ..... lb. .0275/ .0325
Silene "EF" ..... lb. .055 / .06
Silical ..... ton 65.00 /85.00
Witcarb R, c.l. ton100.00

Reodorants
Coumarin ..... lb. 2.75 / 3.25
Curodex 19 ..... lb. 4.75
188 ..... lb. 5.75
198 ..... lb. 6.75
Para-Dors (ABCDE) ..... lb. .25 / 4.00
Rodo No. 0 ..... lb. 4.00 / 4.50
10 ..... lb. 5.00 / 5.50
Vanillin ..... lb. 2.25 / 2.95

Rubber Substitutes
Black ..... lb. .09 / .15
Brown ..... lb. .105 / .1875
White ..... lb. .0975/ .165
Factice
Amberex Type B ..... lb. .20
Brown ..... lb. .095 / .19
Neophax A ..... lb. .165
B ..... lb. .165
White ..... lb. .10 / .20

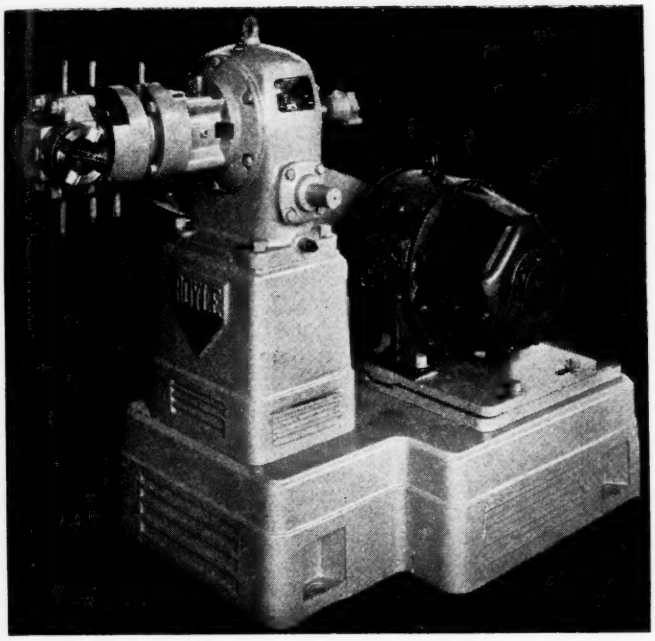
Softeners and Plasticizers
Abalyn ..... lb. .0722/ .0947
Ambidex ..... lb. .23
"S" ..... lb. .23
B.R.T. No. 7 ..... lb. .02 / .021
Belro Resin ..... 100 lbs. 2.71 / 3.00
Bondogen ..... lb. .55 / .60
Bunnatol G ..... lb. .40 / .50
S ..... lb. .40 / .50
Butac ..... lb. .085 / .105
Butyl Roleate ..... lb. .16 / .195
Capryl Alcohol ..... lb. .16 / .195
Circosol-2XH Elasticator for GR-S ..... gal.
Dibenzyl Sebacate ..... lb. .67 / .74
Phthalate ..... lb. .51 / .59
Dibutyl Sebacate ..... lb. .46 / .565
Dicapryl Phthalate ..... lb. .25 / .30
Dipentene ..... gal. .56 / .58
Dipolymer Oil ..... gal. .33 / .38
Dispersing Oil No. 10 ..... lb. .0375/ .04
Duraplex C-50 LV, 100% ..lb. .25 / .295
Dutrex 6 ..... lb. .025 / .0375
Econo-Plast ..... lb. .0325/ .0375
Hercolyn ..... lb. .1122/ .1347
JMH ..... lb. .65 / .67
Marbon S ..... lb. .55 / .65
S-1 ..... lb. .55 / .65
Multi-Plast ..... lb. .0425/ .0475
Myristilene ..... lb. .20 / .30
Naftolen HV ..... lb. .11 / .12
MV ..... lb. .0525/ .0575
LV ..... lb. .0525/ .0575
Nevinol ..... lb. .13
No. 1-D Heavy Oil ..... lb. .04
Nuba resinous pitch (drums)
Grades No. 1 and No. 2..lb. .029
3-X ..... lb. .0425
Palmalene ..... lb. .15
Para Flux (reg.) ..... gal. $0.17 /$0.18
No. 2016 ..... gal. .135 / .19
Para Lube ..... lb. .046 / .048
Paradene No. 1 (drums) ..... lb. .0525
No. 2 ..... lb. .0525
Special (drums)
20 to 35° C. M.P. ..... lb. .0265
35 to 46° C. M.P. ..... lb. .0625
45 to 75° C. M.P. ..... lb. .0675
Paraplex Al-111 ..... lb. .21 / .25
G-25, 100% ..... lb. .75
Phthalate ..... lb. .51 / .59
Paroils ..... lb. .0975/ .18
Picco-100 ..... lb. .09
Piccocizer "30" ..... lb. .055 / .06
Piccolastic A-5 ..... lb. .24 / .245
Piccolyte Resins ..... lb. .15 / .185
Piccoumaron Resins ..... lb. .045 / .15
Piccovol ..... lb. .20 / .25
Pictar ..... gal. .18 / .23
Oil ..... gal. .45
Plasticizer B ..... lb. .35 / .45
35 ..... lb. .205 / .24
36 ..... lb. .305 / .34
Plastoflex No. 10 ..... lb. .20
No. 20 ..... lb. 25
Plastogen ..... lb. .0775/ .08
Plastone ..... lb. .27 / .30
Poly-pale Resin ..... lb. .06 / .07
R-19 Resin (drums) ..... lb. .1075
21 Resin (drums) ..... lb. .1075
Reogen ..... lb. .115 / .12
Resin R6-3 ..... lb. .38 / .40
Ridbo 369 ..... lb. .08 / .09
F ..... lb. .12
Rio Resin ..... lb. .36 / .38
RPA No. 1E ..... lb. .55
2 ..... lb. .65
3 ..... lb. .46
4 ..... lb. .80
5 ..... lb. .57
Rubberol ..... lb. .185
Santicizer B-16 ..... lb. .32 / .36
E-15 ..... lb. .34 / .38
M-17 ..... lb. .355 / .39
Sebacic Acid ..... lb. .48 / .55
Solvenol ..... gal. .56 / .58
Staybelite ..... lb. .06 / .065
Syntac ..... lb. .275 / .35
TR-11 ..... lb. .035
Tarzac ..... lb. .23 / .24
Tricresyl Phosphate ..... lb. .24 / .245
Turgum "S" ..... lb. .0675
Vinsol Resin ..... lb. .025 / .035
Vistac No. 1 ..... lb. .20 / .214
No. 2 ..... lb. .214 / .227
Witco No. 20, l.c.l. ..... gal. .175
X-1 resinous oil (tank car) lb. .011 / .016
XX-100 Resin ..... lb. .0525

Softeners for Hard Rubber Compounding
Resin C Pitch 45° C. M.P. ..lb. .01 / .016
60° C. M.P. ..... lb. .01 / .016
75° C. M.P. ..... lb. .01 / .016

Solvents
Carbon Bisulphide ..... 100 lbs. 5.00 / 5.75†
Tetrachloride ..... gal. .73 / .94†
Cosol No. 1 ..... gal. .26 / .34
No. 2 ..... gal. .25 / .33
No. 3 ..... gal. .22 / .30
GVL ..... lb. 1.00
Industrial 90% benzol (tank car) ..... gal. .15 / .22
Nevsol ..... gal. .245 / .31
Picco ..... gal. .22 / .32
Skellysolve ..... gal. .071 / .105
Tollac ..... gal. .28 / .33

Stabilizers for Cure
Barium Stearate ..... lb. .29 / .32
Calcium Stearate ..... lb. .26 / .27
Laurex (bags) ..... lb. .1475/ .1725
Magnesium Stearate ..... lb. .31 / .32
Stearex, single pressed ..... lb. .15¾ / .16¾
double pressed ..... lb. .15¾ / .16¾
Beads ..... lb. .14¾ / .15⅞
Stearic acid, single pressed lb. .15¾ / .16⅜
Stearite, c.l. ..... lb. .14⅞
Zinc Laurate ..... lb. .29 / .32
Stearate ..... lb. .30 / .31

Synthetic Rubber
Butaprene NF ..... lb. .45 / .60
NL ..... lb. .48 / .63
NXM ..... lb. .50 / .65
Chemigum N-1 ..... lb. .53 / .60
Hycar Latex (dry weight)
OR-15 ..... lb. .415 / .465
OR-25 ..... lb. .345 / .395
OS-10 ..... lb. .345 / .395
Hycar OR-15 ..... lb. .43 / .455
OR-25 ..... lb. .36 / .385
OS-10 ..... lb. .36 / .385
Neoprene Latex Type (dry weight)
60 ..... lb. .28 / .32
571 ..... lb. .25 / .29
Concentrated ..... lb. .28 / .32
572 ..... lb. .28 / .32
Neoprene Type CG ..... lb. .50
E ..... lb. .65
FR ..... lb. .75
KNR ..... lb. .75
M ..... lb. .65
Paraplex X-100 ..... lb. 1.00



Designed for Experimental and Product Extruding

RUGGED is the word to describe this compact and highly efficient Royle continuous extruding machine. It embraces all of the characteristics required for larger and heavier extruding processes.

Primarily designed to become an integral part of laboratory equipment (the technician can be sure that his experiments will have true relation to actual product extruding) the Royle #1 is an efficient producer of such commercial products as tubes, fine wire insulation, mono-filament and thread coating.

JOHN ROYLE & SONS — ROYLE, PATERSON, N. J.

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN 1880

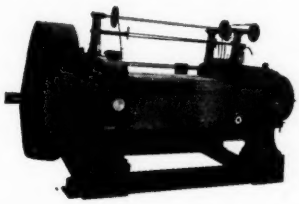
James Day (Machinery) Ltd. London, England REgent 2430 | Home Office B. H. Davis J. W. VanRiper SHerwood 2-8262 | Akron, Ohio J. C. Clinefelter UNiversity 3726 | Los Angeles, Cal. H. M. Royal, Inc. Lafayette 2161

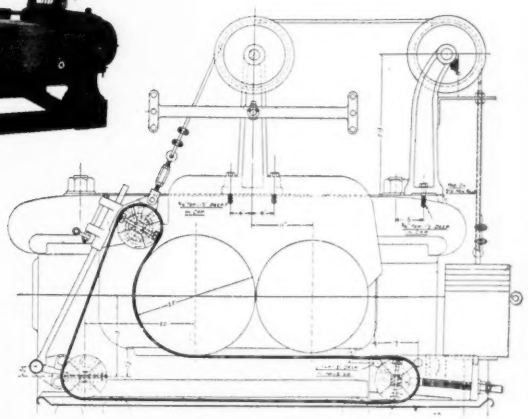
PATERSON 3, NEW JERSEY

Save up to 20% in Milling Time with a . . .

MILL APRON

This is the modern way to mix rubber and pigments—with a saving up to 20% in milling time.





MILL APRONS eliminate a large part of the hard work in milling and masticating—and reduce the dust element as well. Available in sizes up to 84″ wide. In wide use today to help overcome longer milling time of synthetics.

The Akron Standard Mold Co.

Akron — "The Established Measure of Value" — Ohio

Perbunan 18	lb.	$0.35	/ $0.375
26	lb.	.36	/ .385
35	lb.	.38	/ .455
Latex Type H. (55%)	lb.	.38	/ .42
Synthetic 100	lb.	.41	
Tackifiers			
B.R.H. No. 2	lb.	.015	
Piccolastic A-25	lb.	.24	/ .245
Plastic	lb.	.12	
Synthol	lb.	.225	
Synvarite Rc-50	lb.	.40	
Silastic			
Molding and Extrusion Grades			
No. 150	lb.	3.35	/ 3.95
160	lb.	2.90	/ 3.50
167	lb.	2.90	/ 3.50
180	lb.	3.35	/ 3.95
Coating and Laminating Grades			
No. 120	lb.	3.80	/ 4.40
125	lb.	3.80	/ 4.40
Ty-Ply Q	gal.	6.75	/ 8.00
QA	gal.	6.75	/ 8.00
S	gal.	6.75	/ 8.00
SA	gal.	6.75	/ 8.00
Vulcanizing Ingredients			
Magnesia, light (for neoprene)	lb.	.25	
Sulphur	100 lbs.	2.05	
Insoluble, 60	lb.	.16	
Rubbermaker's commercial	100 lbs.	2.05	
Refined	100 lbs.	2.40	
Telloy	lb.	1.75	
Tonox	lb.	.50	/ .59
Vandex	lb.	1.75	
Vultac 1	lb.	.38	/ .45
2	lb.	.38	/ .45
3	lb.	.42	/ .49
Waxes			
Carnauba, No. 3 chalky	lb.	.7125	
2 N.C.	lb.	.7675	
3 N.C.	lb.	.735	/ .745
1 Yellow	lb.	.8325	
2	lb.	.8125	
Carnube	lb.	.49	/ .59
Monten	lb.	.12	/ .17
Rubber Wax No. 118			
Colors	gal.	.86	/ 1.41
Neutral	gal.	.76	/ 1.31

RECLAIMED RUBBER

THE reclaimed rubber market continues extremely tight, with the demand much greater than supply for all types. Despite the best efforts of the industry and the six- to seven-day working week, monthly reclaim production averages 6,000 to 7,000 long tons below wartime peaks. This reduction can be attributed to two factors: (1) the production of different reclaims, with less emphasis on the faster-running compounds made during the war, and (2) the unavoidable increase in contamination of natural scrap by synthetic with consequent increase in tailings and loss in total production of reclaim. This increase in contamination is mainly caused by the greater proportion of retreaded tires offered as scrap. The identification of the type of retread material on these tires is extremely difficult, especially as the retreads are generally found to be quite worn down.

No general expansion of reclaiming facilities is being planned at present. What little new construction being undertaken this year will not give an increase in production sufficient to meet 1946 demands. There is still very little demand for straight synthetic reclaim owing to its higher price. The continuing tightness of the general reclaim market would indicate a slowly rising demand for synthetic reclaim, particularly for novelty items or others for which relief in product prices due to higher cost of synthetic reclaim may be forthcoming.

The already high volume of export demand for reclaim continues to mount. Although generally ignored because of domestic demand, a small quantity of reclaim is being exported under State Department permits.

Reclaimed Rubber Prices

	Sp. Grav.	c per Lb.
Auto Tire		
Black Select	1.16-1.18	7 / 7¼
Acid	1.18-1.22	8 / 8¼
Shoe		
Standard	1.56-1.60	7½ / 7¾
Tubes		
Black	1.19-1.28	11¾ / 12
Gray	1.15-1.26	12½ / 13½
Red	1.15-1.32	12½ / 13
Miscellaneous		
Mechanical blends	1.25-1.50	5 / 6

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

SCRAP RUBBER

THE scrap rubber market last month dropped to a new level of inactivity, the lowest since 1938. Most Akron dealers have clamped down completely, and the eastern field, although still open, has narrowed down considerably. Reclaimers are taking a very stern attitude in the matter of shipments adulterated with synthetic scrap and see little chance that any straight synthetic scrap will be accepted for some time. The majority are taking no synthetic scrap at any price. Even the reclaimers who were liberal enough when accepting it on a percentage basis have become quite strict since adopting the "no synthetic" policy.

Quotations remain at $44 a ton for No. 1 natural peelings delivered, $28 for No. 2, and $26 for No. 3. There is no demand for synthetic peelings at any price. No. 1 recap peelings, although quoted at $35 for a while, are now down to $34, and No. 2 recap peelings are down to $23. Mixed auto tubes at Akron remain in a weak position at 5¼c a pound, but eastern quotations are still holding at 5½c. Miscellaneous scrap is in poor demand all over, and this was clearly shown by the lack of interest in government depot sales. Akron prices for mixed auto tires went down 50c to $18 a ton, and quotations for bus and truck tires dropped $1 to $17.50, with demand weak even at these prices. Some Akron dealers are taking mixed auto tires only on a percentage basis, insisting that at least 50% be passenger tires. The eastern price for mixed tires remained at $17.50, but the pressure has relaxed, and very few reclaimers were absorbing tires. The eastern quotations for natural S.A.G. passenger and truck stock of $17.50 and $15.50, respectively, do not mean that sales can be made any time at these levels.

Price matters remain to be straightened out. The March 22 meeting of OPA and representatives of the Scrap Rubber Institute gave inconclusive results, and another conference will be held, probably in the near future.

The scrap rubber market is such that prices are uniformly below OPA ceilings, and a listing of these ceiling prices is therefore meaningless. Commencing with the June issue, the listing of scrap ceiling prices will be discontinued, and a listing of actual dealers' buying prices will be shown both for Akron and for eastern points. Changes or eliminations of ceiling prices by the OPA will, of course, be shown, should they occur.

Scrap Rubber Ceilings

	c per Lb.
Inner Tubes†	
Red passenger tubes	7½
Black passenger tubes	6¾
Truck tubes	6½
Tires‡	$ per Short Ton
Mixed passenger tires	20.00
Beadless passenger tires	26.00
Mixed truck tires	20.00
Solid tires	36.00
Peelings†	
No. 1 peelings (natural and synthetic)	52.25
(Recap or retread)	44.41
2 peelings (natural and synthetic)	33.00
(Recap or retread)	28.05
No. 1 light colored (zinc) carcass	57.75
Miscellaneous Items*	
Air brake hose	25.00
Miscellaneous hose	17.00
Rubber boots and shoes	33.00
Black mechanical scrap above 115 sp. gr.	20.00
General household and industrial scrap	15.00

† All consuming centers except Los Angeles.
‡ Akron only.
* All consuming centers.

Fixed Government Prices*

	Price per Pound: Civilian Use	Price per Pound: Other Than Civilian Use
Guayule		
Guayule (carload lots)	$0.17½	$0.31
Latex		
Normal (tank car lots)	.26	.43½
Creamed (tank car lots)	.26¾	.44¼
Centrifuged (tank car lots)	.27¾	.45¼
Heat-Concentrated (carload drums)	.29½	.47
Plantation Grades		
No. 1X Ribbed Smoked Sheets	.22½	.40
1X Thin Pale Latex Crepe	.22½	.40
2 Thick Pale Latex Crepe	.22	.39½
1X Brown Crepe	.21⅜	.38⅝
2X Brown Crepe	.21⅛	.38⅜
2 Remilled Blankets (Amber)	.21¼	.38¾
3 Remilled Blankets (Amber)	.21⅛	.38⅝
Rolled Brown	.18	.35½
Synthetic Rubber		
GR-M (Neoprene GN)	.27½	.45
GR-S (Buna S)	.18½	.36
GR-I (Butyl)	.15½	.33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	.26¼
(washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(washed and dried)	.22½	.40
Caucho Ball (crude)	.11⅝	.24¾
(washed and dried)	.19½	.37
Mangabiera (crude)	.08½	.19¾
(washed and dried)	.18	.35½

* For a complete list of all grades of all rubbers see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

SOLVE SYNTHETIC RUBBER ODOR PROBLEMS WITH PARADORS

Eliminating the unpleasant odors in your synthetic rubber products need not be a troublesome or expensive job. You can do it quickly, easily and at low cost with PARADORS*, developed by Givaudan especially for this purpose and long used throughout the rubber industry with highly successful results.

PARADORS, available for use in synthetic elastomers, including Neoprene Latex, are effective not only in covering disagreeable odors in finished products but also in various processing steps where the odors are extremely strong.

Do you make hot water bottles...crib sheets... baby pants...rubber gloves...rainwear or other rubber products where lasting good odor is a definite sales advantage? Givaudan's long experience and diversified knowledge in the field of odors can help you solve your deodorant and reodorant problems effectively. A request will bring prompt cooperation by our technical staff.

**Parador Reg. U. S. Pat. Off.*

G-4 FOR BETTER MILDEW-PROOFING

GIVAUDAN'S G-4 possesses exceptional fungicidal, germicidal and antiseptic properties. It is non-toxic, non-irritating, safe to use in rubberized fabrics that come in contact with the human skin.

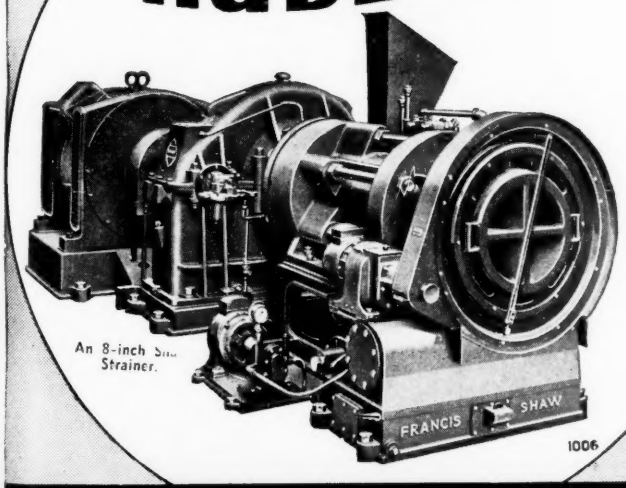
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Givaudan-Delawanna INC.

Industrial Products Division · 330 WEST 42nd STREET · NEW YORK 18, N. Y.

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RUBBER EXTRUDERS



WE HAVE BEEN MAKING ALL TYPES OF EXTRUDERS FOR THE RUBBER INDUSTRY SINCE 1879.

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Your enquiries will receive the benefit of over 65 years' experience. We also manufacture a wide range of other processing plant for the Rubber and Plastic Industries.

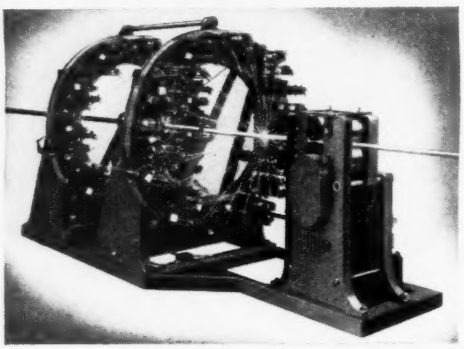
FRANCIS SHAW & CO. LTD. MANCHESTER II ENGLAND

R-140

NEBUTTCO

Horizontal Hose Braiders

We manufacture braiders in various sizes for covering hose with cotton or wire, as used for hydraulic brakes, air, steam, water and pressure greasing.



48-48 CARRIER HORIZONTAL HOSE BRAIDER

NEW ENGLAND BUTT CO.

Established 1842

PROVIDENCE 7, R. I., U. S. A.

RMP

ANTIMONY

FOR RED RUBBER

. . . . The utmost in pleasing appearance with no deteriorating effect whatever.

RARE METAL PRODUCTS CO.

BELLEVILLE, N. J.

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	February, 1946		February, 1945	
	Quantity	Value	Quantity	Value
UNMANUFACTURED				
Balata.....lbs.	4,925	$ 4,283	.....	.....
Crude rubber.....lbs.	690,599	156,973	1,098,638	$ 412,532
Latex.....lbs.	57,569	29,580	.....	.....
Rubber, powdered and waste.....lbs.	297,600	7,641	374,900	10,959
Recovered.....lbs.	2,722,900	198,774	1,558,400	131,118
Synthetic and substitute.....lbs.	340,600	98,569	316,800	103,920
TOTALS	4,114,193	$ 495,820	3,348,738	$ 658,529
PARTLY MANUFACTURED				
Hard rubber in rods or tubes.....lbs.	1,609	$ 1,765	1,489	$ 1,028
Rubber thread, not covered.....lbs.	4,064	3,972	1,831	3,142
TOTALS	5,673	$ 5,737	3,320	$ 4,170
MANUFACTURED				
Belting.....	.....	$ 39,370	.....	$ 27,791
Boots and shoes of rubber, n.o.p.....prs.	4,802	2,832	7,994	6,711
Canvas shoes with rubber soles.....prs.	350	940	.....	.....
Cement.....	.....	18,774	.....	18,867
Clothing of waterproofed cotton or rubber.....	.....	1,544	.....	702
Druggists' sundries.....	.....	26,563	.....	51,990
Gaskets and washers.....	.....	16,325	.....	10,021
Gloves, rubber..doz. prs.	1,709	6,623	1,564	4,740
Heels.....prs.	3,456	298	.....	.....
Hose.....	.....	28,864	.....	23,805
Hot water bottles.....	.....	2,908	.....	11
Inner tubes.....no.	223	942	47	424
Bicycle.....no.	400	272	24	26
Liquid sealing compound.	.....	13,028	.....	5,137
Mats and matting.....	.....	27,570	.....	1,383
Nursing nipples....gross	730	2,445	468	1,757
Packing, rubber.....	.....	11,463	.....	10,007
Tire repair material.....	.....	6,915	.....	14,979
Tires, bicycle.....no.	588	1,044	372	515
Pneumatic.....no.	148	6,624	130	6,892
Solid, for automobiles and motor trucks..no.	10	456	71	2,970
Other.....	.....	1,188	.....	1,107
Other rubber manufactures	.....	210,001	.....	112,824
TOTALS	.....	$ 427,019	.....	$ 302,657
TOTALS, RUBBER IMPORTS	.....	$ 928,576	.....	$ 965,356

Exports of Crude and Manufactured Rubber

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Clothing of rubber and waterproofed clothing..	.....	11,224	.....	7,155
Heels.....prs.	80,748	7,011	174,482	31,550
Hose.....	.....	44,246	.....	30,326
Inner tubes for motor vehicles.....no.	28,252	82,676	12,953	47,072
Soles.....prs.	2,896	924	3,120	713
Tires, pneumatic, for motor vehicles...no.	26,306	534,631	15,163	498,051
Other.....no.	88	321	912	24,505
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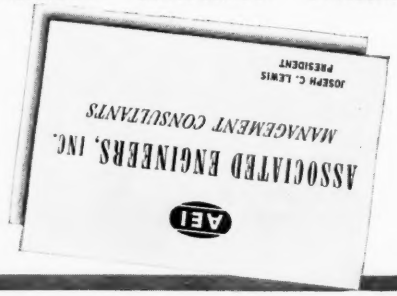
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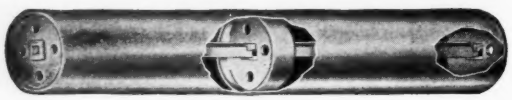
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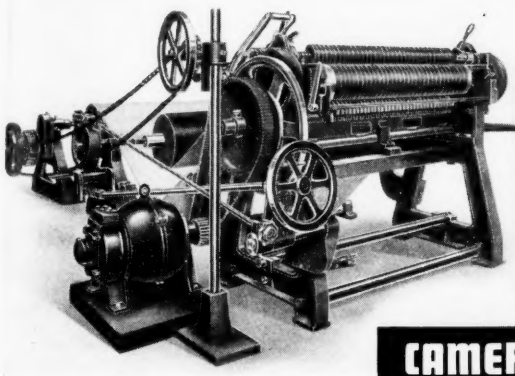
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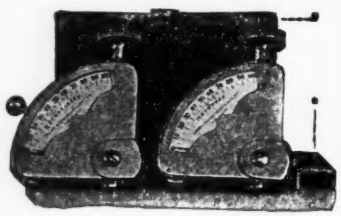
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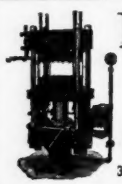
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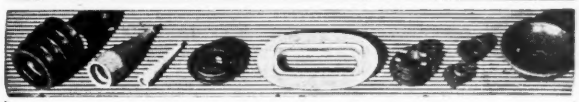
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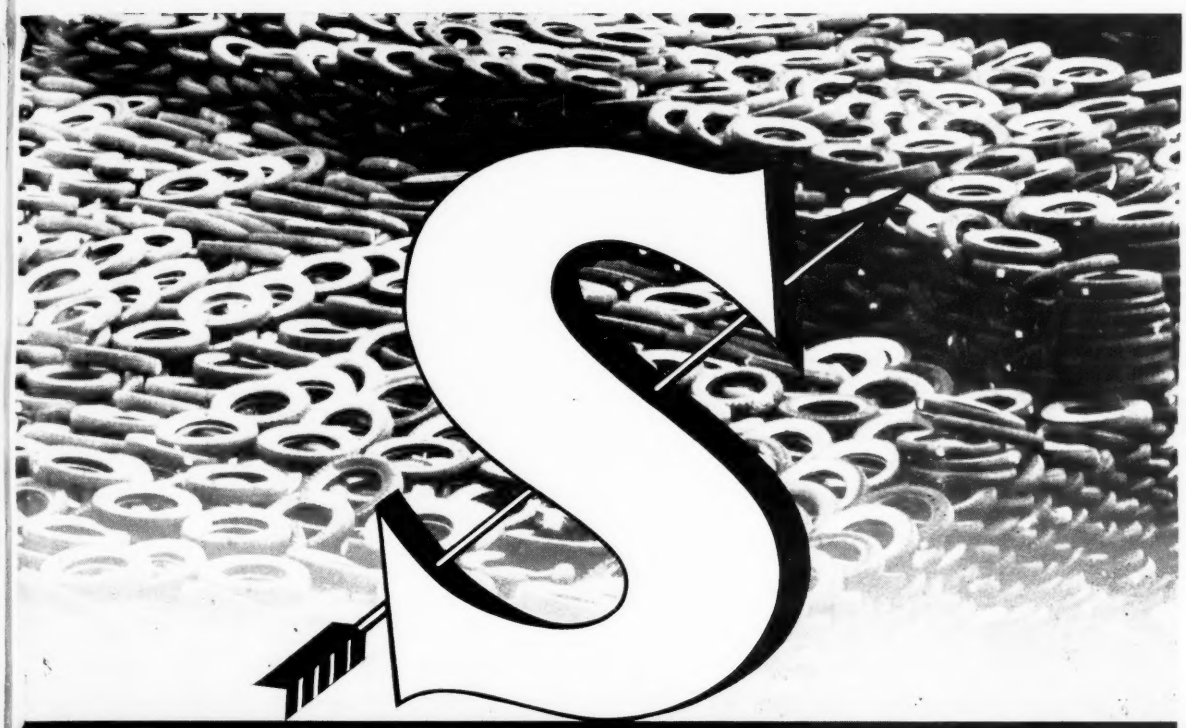
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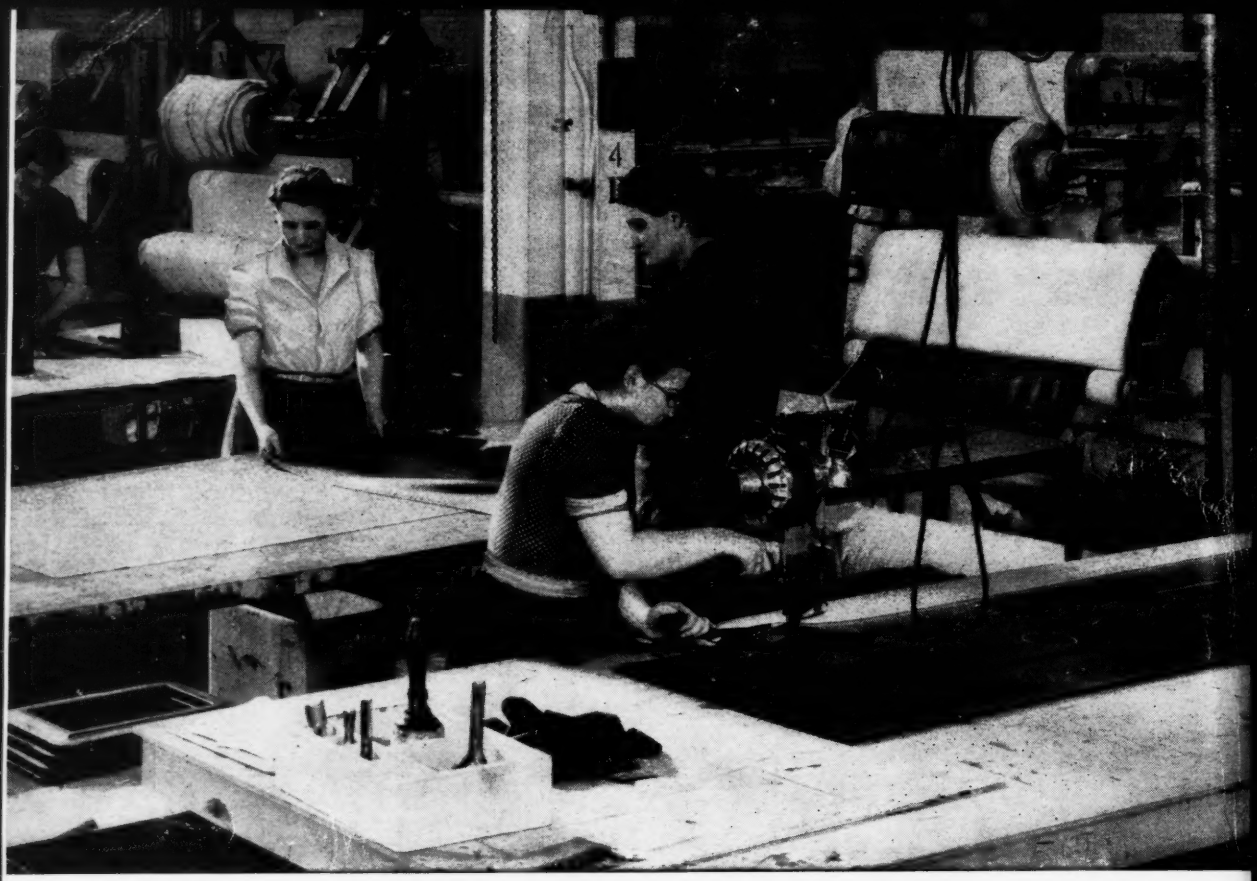
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